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No. 2311

United States

Circuit Court of Appeals

For the Ninth Circuit.

Transcript of Record.

(IN THREE VOLUMES)

ALASKA TREADWELL GOLD MINING COMPANY, a Corporation, ALASKA UNITED GOLD MINING COMPANY, a Corporation, ALASKA MEXICAN GOLD MINING COMPANY, a Corporation, and ROBERT A. KINZIE,

Appellants,

vs.

ALASKA GASTINEAU MINING COMPANY, a Corporation,

Appellee.

VOLUME I.

(Pages 1 to 352, Inclusive.)

Upon Appeal from the United States District Court for the District of Alaska, Division No. 1.

FILED

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Records of M. S. Circuit  
Court of appeals

837





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[Clerk's Note: When deemed likely to be of an important nature, errors or doubtful matters appearing in the original certified record are printed literally in italic; and, likewise, cancelled matter appearing in the original certified record is printed and cancelled herein accordingly. When possible, an omission from the text is indicated by printing in italic the two words between which the omission seems to occur. Title heads inserted by the Clerk are enclosed within brackets.]

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[Names and Addresses of Attorneys.]

*In the District Court for the District of Alaska, No.  
One, at Juneau.*

ALASKA GASTINEAU MINING COMPANY, a  
Corporation,

Plaintiff and Appellee,

vs.

ALASKA TREADWELL GOLD MINING COM-  
PANY, a Corporation, ALASKA UNITED  
GOLD MINING COMPANY, a Corporation,  
ALASKA MEXICAN GOLD MINING  
COMPANY, a Corporation, and ROBERT  
A. KINZIE,

Defendants and Appellants.

Messrs. SHACKLEFORD & BAYLESS and Z. R.  
CHENEY, of Juneau, Alaska,

Attorneys for the Plaintiff and Appellee.

Messrs. HELLENTHAL and HELLENTHAL, of  
Juneau, Alaska,

Attorneys for the Defendants and Appel-  
lants. [1\*]

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*In the District Court for the District of Alaska, Di-  
vision No. One, at Juneau.*

No. 968-A.

ALASKA GASTINEAU MINING COMPANY, a  
Corporation,

Plaintiff,

vs.

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\*Page-number appearing at foot of page of original certified Record.

ALASKA TREADWELL GOLD MINING COMPANY, a Corporation, ALASKA UNITED GOLD MINING COMPANY, a Corporation, ALASKA MEXICAN GOLD MINING COMPANY, a Corporation, and ROBERT A. KINZIE,

Defendants.

**Complaint.**

Comes now the plaintiff above named and complaining of defendants alleges:

I.

That the plaintiff above named is a corporation duly organized and existing.

II.

That the defendants above named, as corporations, are corporations duly organized and existing, and that the defendant Robert A. Kinzie is the Superintendent of each of the said defendant corporations above named.

III.

That on and prior to the month of August, 1909, the International Trust Company was a corporation and in possession and control for the benefit of certain bondholders of that certain power plant at the mouth of Sheep Creek, near Juneau, in the District of Alaska, and hereinafter called the Sheep Creek Power Plant, and hereinafter more fully described.

IV.

That the said International Trust Company was at said time about to organize a corporation known as the Oxford Mining Company for the purpose of taking over the said Sheep Creek Power plant and

other property for the benefit of the bondholders for whom the International Trust Company held the said property in trust.

V.

That prior to August, 1909, the said power plant and property above described had been used by the said International Trust Company and its predecessors in interest for the purpose of and in connection with the generation of power for the operation of what is known as the [2] Sheep Creek Mines, which said mines were provided with a railway, trams, compressor plant, lighting plant, rock-crushers and a thirty-stamp mill, and with a number of other mechanical appliances theretofore used in mining ore from what is known as the Sheep Creek Group of Mines.

VI.

That the International Trust Company was not only in the possession and control of the said Sheep Creek Power plant, but was also in the possession and control of the mines near Juneau, Alaska, known as the Silver Bow Basin mines, including the Ground Hog Group of mines, and also claimed full equitable title to the Sheep Creek Group of mines which the said power plant had theretofore been used to operate.

VII.

That in the month of August, 1909, F. W. Bradley approached the attorney for the International Trust Company and stated that it was the desire of the defendant corporations, above named, to secure possession and control of the said Sheep Creek Power

plant, and that it was the desire of the defendant corporations to construct upon certain millsites hereinafter specifically described a water-power plant of substantial size and efficiency for the generation of electric power of a producing capacity of about 3,000 horse-power, and that he was desirous of leasing the property from the parties interested therein during the period of the construction of said power plant; and upon the construction of the said power plant, to provide to the said International Trust Company, or its successors, sufficient power to operate the mines owned, claimed and controlled by the said International Trust Company in the vicinity of Sheep Creek and Silver Bow Basin, and accept in exchange therefor a deed for the Sheep Creek Power plant.

#### VIII.

That at said time the said F. W. Bradley was the General Consulting Engineer of the said defendant companies and had full charge and control of their operations, constructions and developments in South-eastern Alaska, and full authority to represent the said defendant companies; and that with him at said time was H. H. Taylor, the president [3] of said defendant companies which concurred in the said representations that said F. W. Bradley represented at said time that a current of two hundred electric horse-power would be an ample current to continuously mine and operate the said mines and mining plants. That the representative of the International Trust Company then and there represented to the said F. W. Bradley that a contract of that character would meet with his recommendation, pro-



vided the Oxford Mining Company and the International Trust Company were not restricted to the use of the power at the mines then owned and claimed by them; and further stated that the question of the amount of power which it would be necessary to use continuously in the operation of the International Trust Company's property must be reserved for submission to the said International Trust Company and the parties interested with the International Trust Company in the said properties; and that thereupon, at the request of the said F. W. Bradley, a representative of the International Trust Company departed for Boston and presented a form of contract which had been drawn up under said representations by the said F. W. Bradley to the said International Trust Company and the parties interested with the International Trust Company in the above-described property.

### IX.

That after taking advice upon the subject, the parties above named decided that they would be in need of the continuous and uninterrupted use of three hundred horse-power which would be fully consumed when their operations upon the said properties were resumed; and the said International Trust Company and the parties interested with the International Trust Company notified the said F. W. Bradley that they would be willing to enter into such agreement, provided they were given a continuous and uninterrupted use of three hundred horse-power. The said F. W. Bradley, acting for the defendant companies, replied that he would agree to give a continuous cur-

rent of three hundred horse-power in exchange for the property above specifically described, and that thereupon the International Trust Company caused the Oxford Mining Company, a corporation, to be incorporated, and deeded the said property to the Oxford Mining [4] Company for the benefit of the parties interested through the said International Trust Company in the said property; and thereafter the Oxford Mining Company duly executed a lease in the form drawn up and submitted by the said F. W. Bradley at the time the aforesaid representations were so made, with the exception that the words "two hundred horse-power" as originally given in said lease were changed, in all instances, to the words "three hundred horse-power."

#### X.

That the said memorandum of agreement was entered into between said Oxford Mining Company and the defendant corporations in which the parties thereto respectively undertook and agreed as set forth in the said contract that the Oxford Mining Company and the other parties interested with the Oxford Mining Company were induced to sign the said agreement by the representations of the said F. W. Bradley to the effect that the contract he was offering was a flood-water contract, and would provide to the mines of the Oxford Mining Company a sufficient power to start and operate its machinery and carry on its operations, and to continuously use in such operations an uninterrupted current of three hundred horse-power. That the said contract so signed, sealed and delivered between the parties is



in the following words and figures, to wit: [5]

THIS INDENTURE AND AGREEMENT made and entered into this 14th day of October, 1909, by and between Oxford Mining Company hereinafter called the lessor and The Alaska Treadwell Gold Mining Company, the Alaska Mexican Gold Mining Company and the Alaska United Gold Mining Company hereinafter called the lessees.

WITNESSETH, First, the lessor has P. J. K. this date and does by these presents lease N. P. unto the lessees all of the following described real property situated on and near Sheep Creek in the Harris Mining District, District of Alaska, to-wit:

The Mexico Mill-site U. S. Mineral Entry No. 25, lot 71B. The Belvedere Mill-site U. S. Mineral Entry No. 25, lot 72B. The Jumbo Mill-site U. S. Mineral Entry No. 60, lot No. 260. Also that certain piece or parcel of land beginning at a stake identical with post No. 2 Jumbo Mill-site U. S. Survey No. 260 on the meander line of Gastineau Channel; thence first course along the meander line of Gastineau Channel at ordinary high water mark N. P. J. K.  $52^{\circ} 00'$  W. 54 feet to stake No. 2; thence N. P. second course N.  $48 15'$  E. 200 feet to stake No. 3; then S.  $52.00'$  E. 54 feet to the N. W. side line of Jumbo Mill-site U. S. Survey No. 260, 200 feet to stake No. 1, the place of beginning containing an area of one quarter of an acre more or less, courses expressed from the true meridian, Mag. Var.  $29.30'$ ; and also that certain water right known as the Sheep Creek Water Right and located on Sheep

Creek about three quarters of a mile from its mouth, together with the flume and pipe-line connecting the same with the beach near the mill at the mouth of the said Sheep Creek, also the saw-mill, boarding house, lumber sheds, wharf landing, mill dam, flumes, penstocks, water-wheels, and all other machinery and appliances used in connection with said saw mill, situated near the mouth of said Sheep Creek, together with all machinery, tools, equipment, plants of every kind and description now upon said property for a term of ten (10) years from the date hereof at a monthly rental of One Hundred and Twenty-Five (\$125.00) Dollars per month; payable in gold coin of the United States on the first day of

each month during the term of said lease at  
P. J. K. the office of the lessees at Treadwell,

N. P. Alaska; and it is hereby agreed, that if any rent shall be due and unpaid, or if default shall be made in any of the covenants herein contained, that it shall be lawful for the lessor to re-enter said premises and remove all persons

P. J. K. therefrom, and the lessees do hereby

N. P. covenant, promise and agree to pay the lessor the said rent in the manner hereinbefore specified, and not to let or underlet the whole or any part of said premises without a written consent of the lessor, nor to assign this lease or any part thereof without said written consent, and at the expiration of said term the party of the second part will quit and surrender said premises in as good state and condition as the same now are.

It is the intention of the lessees to erect, equip and

maintain upon said premises a water power plant of substantial size and efficiency for the generation of electric power, and if at any times after Two (2) years from the date hereof the lessor or its assigns shall elect to take a current of not to exceed three hundred (300) electric horse-power which shall be taken from and at the generating plant to be installed upon the leased premises hereinbefore described, the lessees undertake, covenant and agree to deliver said current to the lessor or its assigns upon the execution and delivery by the lessor or its assigns

to the lessee of a deed or deeds conveying  
P. J. K. said leased property herein described to

N. P. the parties of the second part. If prior to the expiration of nine years from the date hereof the lessor does not elect to convey to lessees or their assigns the property herein [6] leased and accept in full consideration therefor

P. J. K. the right to the use the three-hundred

N. P. (300) electric horse-power hereinbefore mentioned, the lessee may at their option

prior to the expiration of the ten (10) years provided in this lease purchase the property herein leased absolutely from the lessor by paying to the lessor the sum of Twenty-Five Thousand Dollars (\$25,000.) in gold coin of the United States; and the lessor covenants and agrees upon tender of said sum of Twenty-five Thousand Dollars (\$25,000.) to execute and deliver such deeds of conveyance to the property herein leased as hereinbefore specified, excepting only as to the title to (1) the one quarter acre tract hereinbefore described and (2) the premises occupied and used by

the existing wharf of the lessor to both of which the lessor now asserts only possessory titles.

P. J. K.    The lessees may at their own cost and  
               N. P.    expense undertake to perfect the said titles  
                   and should lessee wish so to do the lessor shall lend all proper assistance in its power including the using of its name, and should the said titles be so perfected to the said premises or either of them, they shall become the property of the lessor and remain covered by this lease and subject to all the terms and conditions thereof.

The covenants herein contained shall be construed as running with the land and as a charge thereon, so that any successor or successors in interest

P. J. K.    to the lessor or lessees who may acquire  
               N. P.    any interest in and to the titles to the said  
                   land shall be bound by this conveyance in the same manner as if they had executed this agreement; and the lessees hereof may require at their option that the property herein described by conveyed by the lessor to a responsible Trustee for the purpose of carrying out the terms of this agreement, or that deeds and conveyances covering the property herein leased be placed in escrow so as to insure delivery of the same if required under the provisions of any of the covenants of this lease.

If neither of the options herein provided

P. J. K.    for are accepted by either the lessor or the  
               N. P.    lessees then the property and rights herein  
                   described with all the improvements that are or that may be hereafter placed on the said premises shall be and become the property of the lessor.

The provisions herein as to the delivery of three

hundred (300) horse-power at the generating plant to be installed on the premises herein described contemplates the delivery of an uninterrupted current, but the lessees shall not be liable for damages that may arise from operating and physical causes beyond its control.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals the day and year first above written.

Executed in triplicate.

Witness:

HAROLD LAWRENCE.

WALTER W. BLACK.

OXFORD MINING COMPANY,

WALLACE HACKETT,

President,

And HENRY ENDICOTT,

Treasurer.

ALASKA TREADWELL GOLD MINING  
COMPANY,

By H. H. TAYLOR,

President,

F. A. HAMMERSMITH,

Secretary.

ALASKA MEXICAN GOLD MINING CO.

By H. H. TAYLOR,

President,

F. A. HAMMERSMITH,

Secretary.

ALASKA UNITED GOLD MINING CO.

By H. H. TAYLOR,

President,

F. A. HAMMERSMITH,

Secretary. [7]



State of California,

City and County of San Francisco,—ss.

On this 12th day of November, in the year One Thousand Nine Hundred and Nine, before me, P. J. Kennedy, a Notary Public, in and for said City and County, residing therein, duly commissioned and sworn, personally appeared H. H. Taylor, and F. A. Hammersmith known to me to be the President and Secretary respectively of Alaska Mexican Gold Mining Company and Alaska United Gold Mining Co., the Corporations that executed the within and foregoing instrument, and to be the officers who executed the said instrument on behalf of said Corporations therein named, and they acknowledged to me that such Corporations executed the same.

In Witness Whereof, I have hereunto set my hand and affixed my official seal, at my office, in the said City and County of San Francisco, the day and year last above written.

[Seal]

P. J. KENNEDY,

Notary Public in and for the City and County of  
San Francisco, State of California.

State of California,

City and County of San Francisco,—ss.

On this 12th day of November, in the year One Thousand Nine Hundred and Nine, before me, P. J. Kennedy, a Notary Public, in and for said City and County, residing therein, duly commissioned and sworn, personally appeared H. H. Taylor and F. A. Hammersmith known to me to be the President and Secretary respectively of Alaska Treadwell Gold

Mining Co., the corporation that executed the within and foregoing instrument, and to be the officers who executed the said instrument on behalf of said Corporation therein named, and they acknowledged to me that such Corporation executed the same.

IN Witness Whereof, I have hereunto set my hand and affixed my official seal at my office, in the said City and County of San Francisco, the day and year last above written.

[Seal]

P. J. KENNEDY,

Notary Public in and for the City and County of  
San Francisco, State of California.

Commonwealth of Massachusetts,

County of Suffolk,

City of Boston,—ss.

Be it remembered, that on this 14th day of October, 1909, before me, the undersigned, a Notary Public in and for said County and State, personally appeared Wallace Hackett, President, and Henry Endicott, Treasurer, of the Oxford Mining Company, a Corporation, organized under the laws of the State of Maine, to me known to be the individuals described in and who executed the foregoing instrument as such president and Treasurer; and said Henry Endicott having affixed the seal of said Corporation to said instrument, they severally acknowledged to me that he, Wallace Hackett, as President, and he, Henry Endicott, as Treasurer of said Corporation, executed the foregoing instrument for and on behalf of said Corporation as the free and voluntary act of said Corporation for the uses and purposes therein set forth. Then the said Henry Endicott, being by me first duly

sworn, on his oath states that he is the Treasurer of said Corporation, is acquainted and is the custodian, and has in his possession the corporate seal of said Corporation, and that the seal hereinbefore affixed is the corporate seal of said Corporation, and was affixed by him as such Treasurer by order of the Board of Directors of said Corporation. [8]

In Witness Whereof, I have hereunto set my hand and seal the day and year first above written.

[Seal]

LLOYD A. FROST,

Notary Public.

My commission expires Dec. 5th, 1913. [9]

That the defendant corporations, above named, completed the construction of a water-power plant upon the property described in the foregoing agreement prior to the 31st day of October, 1910, and the said Oxford Mining Company elected to take the uninterrupted current of three hundred horse-power provided for in said agreement for the full, beneficial and practical use of the said current, to the full extent of three hundred horse-power, and to convey the property above specifically described, to the said defendant corporations, which said conveyance was duly accepted, time for receiving the same waived, and the same was received by the defendant corporations on or about the 22d day of April, 1911. That from the 22d day of April, 1911, until the 8th day of November, 1912, no power whatever was delivered by the defendant corporations to the Oxford Mining Company, or any of its assigns, and that the said defendant companies have had the free and uninterrupted use of the entire output of the said electric



plant between said dates, and have not paid to the Oxford Mining Company or its assigns any sum whatever since the 22d day of April, 1911.

### XI.

That about the 1st of June, 1912, the Oxford Mining Company sold all of its property and property rights in Southeastern Alaska to the Alaska Gastineau Mining Company, the plaintiff above named, and subsequently at the request of the defendant corporations above named, the plaintiff procured from the Oxford Mining Company a specific assignment of all of the rights of the Oxford Mining Company to this plaintiff under the contract for the said three hundred horse-power above described, which said assignment was duly recorded in Book 19 of Miscellaneous Records of the Juneau Recording Precinct, at page 139, on the 14th of October, 1912; and the defendant corporations above named were duly notified of the said assignment. That during the month of June, 1912, this plaintiff entered into the possession of all the mines, mining property and mining rights of the Oxford Mining Company, including the Sheep Creek Group of Mines and the Silver Bow Basin and Ground Hog Group of Mines.

### XII.

That it is the purpose and intention of this plaintiff to mine [10] an ore deposit stretching from the Sheep Creek Group of Mines in Sheep Creek Basin across the divide and into the Ground Hog Group of Mines in Silver Bow Basin containing 50,000,000 tons of ore more or less; and that among the properties acquired by this plaintiff is the prop-

erty known as the Perseverance Mine lying between the Ground Hog Group of Mines in Silver Bow Basin and the Sheep Creek Group of Mines in Sheep Creek; and that arrangements have been made for the rapid development of the said mines and for the construction of a six thousand ton crushing plant near Sheep Creek, upon Gastineau Channel, and capital provided for the purpose of construction of such plant and for the development work which will become necessary to produce a daily tonnage of not less than six thousand tons upon the completion of the said milling plant, which is to be completed at the end of about two years. That among other things the plaintiff has started an adit tunnel from Sheep Creek Basin underneath and through the Sheep Creek mines to the Ground Hog Group of mines and the Perseverance mines, and has also started a system of stopes, upraises, shafts, levels and ore chutes at and near the Perseverance and Ground Hog Group of Mines which will be adequate for the development of the same if continuously prosecuted to produce the tonnage required by the said milling plant upon its completion, but which will be inadequate to produce the tonnage and will greatly impair the producing capacity and delay the period of production if interfered with or if any delay is suffered in the initiation of said work. That since the month of June, 1912, the plaintiff has been using every effort to open upon its mining property as many working faces as is possible so as to make room for more drills and other appliances in the rapid development of the said mining property.

XIII.

That the said arrangements for the development of the said mining property were made in reliance upon the undertaking of the defendant corporations herein and their promise and representation that they would furnish a full and uninterrupted current of three hundred electric horse-power of full and practical efficiency for use by the plaintiff corporation and upon the representations that they would be able to use [11] three hundred horse-power from the electric plant of the defendant corporations during said period of development. That relying upon said representations the plaintiff has engaged for work in Silver Bow Basin in connection with the underground development of the said mine a force of more than 175 men, and is at a daily expense in maintaining said working force in the said underground development in Silver Bow Basin of over \$750.00. That plaintiff has outstanding bonds in the principal sum of \$3,500,000, upon which interest is accumulating and upon which no interest can be paid until the development work above mentioned is completed as proposed simultaneously with the completion of the said milling plant; and that the character and nature of the ore is such as to produce a profit thereon as soon as the work hereinbefore described is completed, and to pay the interest upon such bonds and dividends upon the stock of the company; and that any delay in the underground workings above set forth will postpone the producing capacity of the said plant and will cause great and irreparable damage to the plaintiff company which

cannot be adequately compensated or estimated in money. That labor is in great demand in the mining district near the said mines and that it will be very difficult to hold labor unless the laborers above mentioned are kept continuously at work during the winter season of 1912-1913.

#### XIV.

That prior to the 8th day of November, 1912, the defendant companies were notified of the assignment of the rights of the Oxford Mining Company to this plaintiff and were requested to deliver the uninterrupted current of three hundred horse-power provided for in the said contract. That at said time there was installed upon the property of the company in Silver Bow Basin a 200 horse-power motor of the usual type used in mining operations of like character throughout the United States and in the Juneau Mining District, which said motor was connected with an Ingersoll-Rand compressor using 165 horse-power at 80 pounds pressure, at which pressure the said compressor has been operated. That at the Sheep Creek plant of the plaintiff company there was installed [12] a 150 horse-power motor and a 20 horse-power motor; and that in connection with the 150 horse-power motor there was used a compressor of 165 horse-power for the purpose of driving the adit tunnel above mentioned through the Sheep Creek mines and from thence underneath the Ground Hog and Perseverance Mines. That the defendant corporations at said time connected their power-plant with the power-line of the plaintiff herein and set in their power-house a so-called Auto-



matic Circuit-Breaker which said circuit-breaker was so set as to break the circuit when a maximum of 100 amperes was carried over said current. That from the 8th of November, 1912, to the 2d of December the machinery above described at Sheep Creek was operated without difficulty from said current so supplied by the defendant corporations, and the setting of the circuit-breaker at said point proved to be sufficient to produce a practical and working efficiency at the power-house of the defendant company to three hundred horse-power. That on the 2d day of December, the machinery in Silver Bow Basin at the Perseverance Mine was also placed upon the said line and successfully operated until the 4th of December when operations at the Perseverance mine were temporarily suspended by reason of a fire which destroyed a 100-stamp mill of the plaintiff company at that point. That on the 6th of December one Proebstel, one of the servants of the defendant corporations, under the supervision of the defendant Kinzie, visited the Sheep Creek Power-house and reduced the setting of the circuit-breaker to a point which would throw off the current at 56 amperes; that is to say, the said automatic circuit-breaker was set so as to sever all current connections with the plaintiff company as soon as 56 amperes passed over the circuit at the Sheep Creek power-house to the wires of the plaintiff company in total disregard of the actual horse-power delivered and in total disregard of the power factor actually existing from time to time in plaintiff's operations, and total disregard of the reduced voltage required by the

plaintiff company when the amperage increased in starting plaintiff's machinery. That the said circuit-breaker so installed is not of the usual or ordinary type used in electrical appliances for such purposes, but is so [13] constructed that it is instantaneous. That the ordinary and usual type of circuit-breaker used for such purpose is provided with what is known as a thirty second time relay, which guards against the circuit-breaker being thrown out by momentary and unavoidable surges of current.

#### XV.

That the starting of machinery which will consume less than a given amount of power often causes what is known as a starting surge which lasts for a few seconds, but from a practical standpoint is not accounted for in electrical connections, and is disregarded and provided against by the ordinary type of time relay circuit-breaker. That the time relay circuit-breaker is one in common use in this vicinity, being used by defendant corporations in their electrical connections—except in their connections with the plaintiff.

#### XVI.

That in their so-called delivery of the horse-power under the contract above described the defendant corporations have estimated the power to be delivered upon the basis of what is known as unity power factor, that is to say, defendants have taken the position that a certain number of amperes multiplied by a power factor of 100 per cent and multiplied by a voltage of 2300 volts, multiplied by a constant at-

tributed to the three-phase electric current, will theoretically produce 300 horse-power, whereas at those times when the amperage increases by reason of starting surge or otherwise the high voltage artificially maintained by the defendants is unnecessary to the use of the plaintiff, and whereas the power factor actually involved is in all instances under 85% per cent and at the times when the amperage is high by reason of starting surge or otherwise, a great deal less than 85%. That the only measure of horse-power in proper and common practice upon electric current is what is known as the wattmeter, and that the defendants herein have failed to provide themselves with a wattmeter in estimating the amount of power taken by the plaintiff from their power-house under said contract, although in their own operations they measure the power used [14] by themselves by a wattmeter. That the wattmeter is the common and ordinary meter used in measuring horse-power and that the plaintiff herein has requested the defendants to allow them to place a wattmeter at the power-house of the defendants upon the power line used by the plaintiff at said power-house, and the defendants have refused to permit a wattmeter to be placed upon said current.

## XVII.

That it is the common practice where a certain amount of horse-power is contracted for to allow a starting surge to the consumer sufficient to start the machinery which will consume the current contracted for.

## XVIII.

That on or about the 13th of December, 1912, the said current was again turned on to the operation of the machinery at the Perseverance mine alone and the machinery successfully started and the current continued to operate the machinery at the Perseverance mine up until the night of the 24th of December when the mine shut down for Christmas Day, and that since said time the plaintiff herein has been unable to start the machinery at the Perseverance mine with defendant's current although the said machinery has not in anywise been altered or changed, nor the loads thereon been increased; and upon each attempt to start the said machinery the said circuit-breaker has been thrown out and the Perseverance mine has been without power since the night of the 24th of December, 1912, except a small amount of power derived from a water-wheel in Silver Bow Basin which has been able to furnish about half of the lights required at the mine. By way of experimentation, however, plaintiff company has been able to start and turn over its motors at the Perseverance mine and run them for considerable periods of time upon electric currents of less than 300 horse-power; in fact of less than 230 horse-power, but the currents above named are not available to the plaintiff for continuous use in the operation of the said mine; but the plaintiff has been unable to start its machinery or turn it over or to start its motors from the current supplied by the defendant corporations. [15]



XIX.

The defendant corporations have so connected the plaintiff's power lines with their plant that they have placed it beyond the control of the plaintiff to prevent a momentary surge or current in starting their machinery which for an instant draws upon the general supply of electricity at said plant and causes the said circuit-breaker to break the circuit. That the defendants have adopted the following practice in order to harass and annoy the plaintiff in securing the power to which it is entitled: Whenever the circuit-breaker is driven out by a momentary surge of current the defendants refuse to replace the circuit-breaker in place immediately and restore the current, but prohibit their electricians at said plant who are amply competent for that purpose from replacing the circuit-breaker and restoring the current, and refuse to restore the circuit-breaker and current until they are informed at Treadwell, Alaska, a point at least two miles distant from their Sheep Creek power plant and across Gastineau Channel, an arm of the North Pacific Ocean, and then at their convenience send a man across Gastineau Channel in a small boat to restore the circuit-breaker to its place. Plaintiff alleges not only that it is entitled to a reasonable surge for the purpose of starting its machinery so as to consume the continuous current of three hundred horsepower which the defendants undertake to deliver in the said contract; but further allege that if plaintiff was absolutely restricted to an uninterrupted current of 300 horse-power and was provided with

an uninterrupted current of 300 horse-power, the machinery now installed at the Perseverance mine could be started and operated continuously and after the starting thereof much less than 300 horse-power would be consumed. Plaintiff alleges that it is the duty of the defendants to furnish a current of 300 horse-power in such a way that it will be uninterrupted and so divorced from the defendants' other supply of electricity at said plant, that the defendants will not be enabled to make the momentary and involuntary drawing upon said current a pretext for depriving the plaintiff of power.

## XX.

The plaintiff alleges that the defendant corporations have not [16] since the 6th day of December, 1912, furnished to the plaintiff at any time the 300 horse-power called for in the said contract, and have failed, at all times, far short of delivery of the same; and further allege that the defendants have failed to provide them with an uninterrupted current of 300 horse-power, but have so arranged their connections with the plaintiff's power line that constant interruptions occur, and insist upon continuing the interruptions at their convenience.

## XXI.

Plaintiff respectfully shows to this Court that unless a momentary starting surge sufficient to start the machinery of the plaintiff to a point that it will consume 300 horse-power at the power plant of the defendant corporations, is allowed to this plaintiff, that plaintiff will suffer irreparable injury and damage and that the spirit and intent of the contract

herein set forth will be violated, and that the plaintiff will never be able to enjoy an uninterrupted current of 300 horse-power under the contract as provided for therein.

## XXII.

Plaintiff further shows that the damage which plaintiff will sustain by reason of being deprived of said power cannot be estimated and the violations and infringements of the contract on the part of the defendants herein; defendants threaten to continue delay by breaking the circuit as often as possible under the conditions hereinbefore alleged; and that the controversy unless taken cognizance of in [17] equity will cause a multiplicity of suits, and that plaintiff is without plain, speedy and adequate remedy at law and will suffer immediate and irreparable loss, damage and injury in its business unless this Court lends to the aid of the plaintiff its Writ of Injunction and grants to this plaintiff pending a preliminary injunction and restraining order restraining the defendants from the acts for which injunction *pendente lite* is prayed. That the plaintiff cannot secure power from any other source for its operations in the development of Silver Bow Basin, and that there are no power plants adequate to furnish the current required in Silver Bow Basin other than the power plant of the defendant corporations.

WHEREFORE, plaintiff prays:

### I.

That the contract herein be specifically enforced both in its letter and in its spirit and intent; and

## II.

That the defendants be decreed to furnish to the plaintiff a sufficient amount of electrical horse-power to start its machinery so as to give to plaintiff an effective and uninterrupted use of the full current of 300 horse-power. And, in the alternative, [18]

## III.

That the defendants be compelled and decreed to install machinery and appliances in their power plant so as to give to plaintiff a separate and distinct current, uninfluenced by other conditions in the plant, and so as to produce an uninterrupted and uninterruptible current of 300 horse-power; and

## IV.

That the plaintiff and defendants herein be decreed to place in the said power plant of the defendant companies proper wattmeters and other appliances for the measurement of the actual horse-power used by the plaintiff; and

## V.

That a Restraining Order and Injunction, *pendente lite*, be issued restraining the defendants herein from maintaining the said automatic circuit-breaker or in anywise disconnecting a current of not less than 300 horse-power from the power lines of the plaintiff, and restraining them from interfering with the plaintiff in any way from procuring a sufficient starting load which will make practical and effective use of an uninterrupted current of 300 horse-power; and for such further relief, both permanent and temporary,

as to the Court may seem meet and proper in the premises.

SHACKLEFORD & BAYLESS,  
Z. R. CHENEY,

Attorneys for Plaintiff.

United States of America,  
District of Alaska,—ss.

B. L. Thane, being first duly sworn, on oath deposes and says: That I am the General Manager of the plaintiff corporation; have read the foregoing complaint, know that the contents thereof [19] and I believe the same to be true.

B. L. THANE.

Subscribed and sworn to before me this 30th day of December, 1912.

[Seal]

W. S. BAYLESS.

Original. No. 968-A. In the District Court for the District of Alaska, Division No. 1, at Juneau. Alaska Gastineau Mining Co., a Corporation, Plaintiff, vs. Alaska Treadwell Gold Mining Company, a Corporation, et als., Defendants. Complaint. Shackleford & Bayless, Attorneys for Plaintiff. Office, Juneau, Alaska. Filed Dec. 30, 1912. E. W. Pettit, Clerk. By H. Malone, Deputy. [20]



*In the District Court for the Territory of Alaska,  
Division No. 1, at Juneau.*

Case No. 968-A.

ALASKA GASTINEAU MINING COMPANY, a  
Corporation,

Plaintiff,

vs.

ALASKA TREADWELL GOLD MINING COM-  
PANY, a Corporation, ALASKA UNITED  
GOLD MINING COMPANY, a Corporation;  
ALASKA MEXICAN GOLD MINING  
COMPANY, a Corporation, and ROBERT  
A. KINZIE,

Defendants.

**Demurrer.**

Come now the defendants and each of them and demur to the complaint of the plaintiff herein for the reasons:

First. That the complaint does not state facts sufficient to constitute a cause of action against said defendants or against either or any of them;

Second. That the Court has no jurisdiction to grant the relief demanded;

Third. That no facts are set up in the complaint under which a court of equity would have jurisdiction to grant the relief asked for or any relief whatsoever against any one or more of the defendants; and

Further that it appears upon the fact of the complaint itself that the plaintiff has a plain, speedy and

adequate remedy at law.

HELLENTHAL & HELLENTHAL,  
Attorneys for all the Defendants,

[Endorsed]: Original. No. 968-A. In the District Court for the District of Alaska, Division No. 1. Alaska Gastineau Mining Company, a Corporation, Plaintiff, vs. Alaska Treadwell Gold Mining Company, et al., Defendant. Demurrer. Hellenthal & Hellenthal, Attorneys for Defendants. Office, Juneau, Alaska. Filed Jan. 6, 1913. E. W. Pettit, Clerk. By ———, Deputy. [21]

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*In the District Court for the Territory of Alaska,  
Division No. 1, at Juneau.*

Case No. 968-A.

ALASKA GASTINEAU MINING COMPANY,  
Plaintiff,

vs.

ALASKA TREADWELL GOLD MINING COMPANY, a Corporation, ALASKA UNITED GOLD MINING COMPANY, a Corporation, ALASKA MEXICAN GOLD MINING COMPANY, a Corporation, and R. A. KINZIE,

Defendants.

**Answer.**

Come now the above-named defendants, and each of them, and for answer to the complaint of the plaintiff herein, admit, deny and allege as follows:

I.

Defendants admit paragraph I of the complaint.

## II.

Defendants admit paragraph II of the complaint.

## III.

For answer to paragraph III of the plaintiff's complaint the defendants allege that they deny that the International Trust Company was at the time mentioned, or at any other time, the owner of or in control of what is known as the Sheep Creek Power plant, but was in control of a small power plant, then situate near the present site of the Sheep Creek Power plant, which said power plant had the capacity to generate approximately 100 horse-power.

## IV.

For answer to paragraph IV of the plaintiff's complaint the defendants aver that they admit the same.

## V.

For answer to paragraph V of the plaintiff's complaint the [22] defendants aver that the said International Trust Company and its predecessors were never in control of the Sheep Creek Power plant, but did control as above stated a small power plant of a capacity of approximately 100 horse-power situate near the said Sheep Creek power-plant; as to the balance of the allegations of said paragraph V the defendants aver that while they admit that the International Trust Company at the time named owned some of the appliances mentioned, to wit, the Compressor plant, and the lighting plant, that they have not sufficient knowledge or information concerning said company's ownership as to the balance of the appliances, machines, and property rights mentioned, and therefore deny the allegations touching the same.

VI.

For answer to paragraph VI of the plaintiff's complaint, the defendants aver that at the time mentioned the said International Trust Company did own certain mining claims in and near Silver Bow Basin, but deny the remaining allegations contained in said paragraph.

VII.

For answer to paragraph VII of the plaintiff's complaint, the defendants aver that they deny the same and the whole thereof and each and every allegation therein contained, except as hereinafter qualified, explained or expressly admitted.

VIII.

Referring to paragraph VIII of the plaintiff's complaint, the defendants admit that at the time mentioned F. W. Bradley was the General Consulting Engineer of the defendant companies and possessed the power and authority to act for and in behalf of the said companies, and the defendants further admit that one H. H. Taylor was president of the defendant companies, but as to each [23] and all of the remaining allegations contained in said paragraph the defendants aver that they deny the same, and each and all of them, except as hereinafter expressly admitted, qualified or explained.

IX.

Referring to paragraph IX of the plaintiff's complaint, the defendants allege that they deny each and every allegation therein contained except as hereinafter admitted, qualified or expressly explained.

X.

With reference to paragraph X of the plaintiff's

complaint, the defendants aver that they deny each and every allegation in said paragraph except as hereinafter admitted, qualified or expressly explained.

### XI.

For answer to paragraph XI of the plaintiff's complaint, the defendants aver that on or about the date mentioned the contract set up in the complaint relating to the 300 horse-power was assigned by the Oxford Company to the plaintiff company, and that the defendant companies were notified of said assignment; as to each and all of the remaining allegations of said paragraph the defendants aver that they have not sufficient knowledge to form a belief and therefore deny the same.

### XII.

Referring to paragraph XII of the plaintiff's complaint, the defendants aver that they have not sufficient knowledge or information to form a belief and therefore deny the same, and each and every allegation therein contained.

### XIII.

Referring to paragraph XIII of the plaintiff's complaint, the defendants aver that they have not sufficient knowledge or information concerning the same to form a belief, and therefore deny each and every allegation therein contained. [24]

### XIV.

Referring to paragraph XIV of the plaintiff's complaint, the defendants aver that they admit that they were notified of the assignment of the rights of the Oxford Company under the contract set up in



the complaint, and that they were requested to deliver to the plaintiff company the 300 horse-power provided for in the Oxford Contract; and concerning the remaining allegations in said paragraph XIV the defendants deny each and every allegation in said paragraph contained except in so far as the same are hereinafter admitted, qualified or explained.

XV.

Referring to paragraph XV of the plaintiff's complaint, the defendants aver that they deny each and every allegation in said paragraph contained.

XVI.

Referring to paragraph XVI of the plaintiff's complaint, the defendants aver that they deny each and every allegation in said paragraph contained except in so far as the same is hereinafter expressly admitted.

XVII.

Referring to paragraph XVII of the plaintiff's complaint, the defendants deny each and every allegation in said paragraph contained.

XVIII.

Referring to paragraph XVIII of the plaintiff's complaint, the defendants aver that they have not sufficient knowledge and information concerning the matters in said paragraph contained, except such as are hereinafter expressly referred to, and therefore except as to those last mentioned matters defendants deny each and every allegation in said paragraph contained; in relation to the allegations of said paragraph the defendants further aver that [25] they at all times therein mentioned were ready and willing

to furnish the plaintiff at their power-house in Sheep Creek, a full uninterrupted current of 300 horse-power in full compliance with the contract hereinafter referred to.

XIX.

Referring to paragraph XIX of the plaintiff's complaint, the defendants deny each and every allegation in said paragraph contained.

XX.

Referring to paragraph XX of the plaintiff's complaint, the defendants deny each and every allegation in said paragraph contained.

XXI.

Referring to paragraph XXI of the plaintiff's complaint, the defendants deny each and every allegation in said paragraph contained.

XXII.

Referring to paragraph XXII of the plaintiff's complaint, the defendants deny each and every allegation in said paragraph contained.

And the defendants further answering the plaintiff's complaint allege:

I.

That negotiations were had between the defendant corporations and the Oxford Company looking toward the leasing and sale of certain property rights from the Oxford Company to the defendant corporations; that such negotiations terminated in the execution of a written contract between the parties which is in words and figures as follows, to wit: [26]

THIS INDENTURE AND AGREEMENT made and entered into this 14th day of October, 1909, by

and between OXFORD MINING COMPANY hereinafter called the lessor and the Alaska Treadwell Gold Mining Company, the Alaska Mexican Gold Mining Company and the Alaska United Gold Mining Company hereinafter called the lessees.

WITNESSETH,—First, the lessor has this date and does by these presents lease unto the lessees all of the following described real property situated on and near Sheep Creek in the Harris Mining District, District of Alaska, to wit:

The Mexico Mill-site U. S. Mineral Entry No. 25, Lot 71B. The Bellviders Mill-site U. S. Mineral Entry No. 25, lot 72B. The Jumbo Mill-site U. S. Mineral Entry No. 60, lot No. 260. Also that certain piece or parcel of land beginning at a stake identical with post No. 2 Jumbo Mill-site U. S. Survey No. 260 on the meander line of Gastineau Channel, thence first course along the meander line of Gastineau Channel at ordinary high water mark N. 52.00' W. 54 feet to stake No. 2; thence second course N. 48° 15' E. 200 feet to stake No. 3; thence S. 52.00' E. 54 feet to the N. W. side line of Jumbo Mill-site U. S. Survey No. 260 to stake No. 4; thence S. 46° 15' West along the northwest side line Jumbo Mill-site U. S. Survey No. 260, 200 feet to stake No. 1, the place of beginning containing an area of one-quarter of an acre more or less courses expressed from the true meridian, Mag. Var. 29.30'; and also that certain water right known as the Sheep Creek Water Right and located on Sheep Creek about three-quarters of a mile from its mouth, together with the flume and pipe-line connecting the same with the beach near

the mill at the mouth of the said Sheep Creek, also the saw-mill, boarding-house, lumber sheds, wharf landing, mill dam, flumes, penstocks, water-wheels, and all other machinery and appliances used in connection with said saw-mill, situated near the mouth of said Sheep Creek, together with all machinery, tools, equipment, plants of every kind and description now upon said property [27] for a term of ten (10) years from the date hereof at a monthly rental of One Hundred and Twenty-five (\$125.00) Dollars per month, payable in gold coin of the United States on the first day of each month during the term of said lease at the office of the lessees at Treadwell, Alaska; and it is hereby agreed, that if any rent shall be due and unpaid, or if default shall be made in any of the covenants herein contained, that it shall be lawful for the lessor to re-enter said premises and remove all persons therefrom, and the lessees do hereby covenant, promise and agree to pay the lessor the said rent in the manner hereinbefore specified, and not to let or underlet the whole or any part of said premises without a written consent of the lessor, not to assign this lease or any part thereof without said written consent, and at the expiration of said term the party of the second part will quit and surrender said premises in as good state and condition as the same now are.

It is the intention of the Lessees to erect, equip and maintain upon said premises a water-power plant of substantial size and efficiency for the generation of electric power, and if at any time after two (2) years from the date hereof the lessor or its assigns shall elect to take a current



of not to exceed three hundred (300) electric horse-power which shall be taken from and at the generating plant to be installed upon the leased premises hereinbefore described, the lessees undertake covenant and agree to deliver said current to the lessor or its assigns upon the execution and delivery by the lessor or its assigns to the lessee of a deed or deeds conveying said leased property herein described to the party of the second part. If prior to the expiration of nine years from date hereof the lessor does not elect to convey to lessees or their assigns the property herein leased and accept in full consideration therefor the right to use of the three hundred (300) electric horse-power hereinbefore mentioned, the lessees may at their option prior to the expiration of the ten (10) years provided in this lease purchase the property herein leased absolutely from the [28] lessor by paying to the lessor the sum of Twenty-five Thousand dollars (25,000,) in gold coin of the United States; and the lessor covenants and agrees upon tender of said sum of Twenty-five Thousand Dollars (\$25,000,) to execute and deliver such deeds of conveyance to the property herein leased as hereinbefore specified, excepting only as to the title to (1) the one quarter acre tract hereinbefore described and (2) the premises occupied and used by the existing wharf of the lessor to both of which the lessor now asserts only possessory titles. The lessees may at their own cost and expense undertake to perfect the said titles and should lessee wish so to do the lessor shall lend all proper assistance in its power including the using of its name, and should



the said titles be so perfected to the said premises or either of them they shall become the property of the lessor and remain covered by this lease and subject to all terms and conditions thereof.

The covenants herein contained shall be construed as running with the land and as a charge thereon, so, that any successor or successors in interest to the lessor and or lessees who may acquire any interest in and to the titles to the said land shall be bound by this convenance in the same manner as if they had executed this agreement; and the lessees hereof may require at their option that the property herein described be conveyed by the lessor to a responsible trustee for the purpose of carrying out the terms of this agreement, or that deeds and conveyances covering the property herein leased be placed in escrow so as to ensure delivery of the same if required under the provisions of any of the covenants of this lease.

If neither of the options herein provided for are accepted by either the lessor or lessees then the property and rights herein described with all the improvements that are or that may hereafter be placed on the said premises shall be and become the property of the lessor.

The provisions herein as to the delivery of three hundred [29] (300) horse-power at the generating plant to be installed on the premises herein described contemplates the delivery of an uninterrupted current, but the lessees shall not be liable for damages that may arise from operating and physical causes beyond its control.

IN WITNESS WHEREOF the parties have hereunto set their hands and seals the day and year first above written. (Executed in triplicate.)

Witness:

HAROLD LAWRENCE,

WALTER W. BLACK.

OXFORD MINING COMPANY.

By WALLACE HACKETT,

President.

And HENRY ENDICOTT,

Treasurer.

[Seal—Oxford Mining Company]

ALASKA TREADWELL GOLD MINING  
COMPANY,

By H. H. TAYLOR,

President.

F. A. HAMMERSMITH,

Secretary.

ALASKA MEXICAN GOLD MINING  
COMPANY,

By H. H. TAYLOR,

President.

F. A. HAMMERSMITH,

Secretary.

ALASKA UNITED GOLD MINING COM-  
PANY,

By H. H. TAYLOR,

President.

F. A. HAMMERSMITH,

Secretary.

[Seal—Alaska Treadwell Gold Mining Co.]

[Seal—Alaska Mexican Gold Mining Co.]

[Seal—Alaska United Gold Mining Co.]

Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

Be it remembered that on this 14th day of October, 1909, before me, the undersigned, a Notary Public, in and for said County and State, personally appeared Wallace Hackett, President, and Henry Endicott, Treasurer, of the Oxford Mining Company, a corporation organized [30] under the laws of the State of Maine, to me known to be the individuals described in and who executed the foregoing instrument as such President and Treasurer; and said Henry Endicott having affixed the seal of said Corporation to said instrument, they severally acknowledged to me that he, Wallace Hackett, as President and he, Henry Endicott, as Treasurer of said Corporation executed the foregoing instrument for and on behalf of said Corporation as the free and voluntary act of said Corporation for the uses and purposes therein set forth. Then the said Henry Endicott, being by me first duly sworn, on his oath states that he is the Treasurer of said Corporation, is acquainted and is the custodian, and has in his possession the corporate seal of said Corporation and that the seal hereinbefore affixed is the corporate seal of said Corporation and was affixed by him as such Treasurer by order of the Board of directors of said Corporation.

In Witness Whereof I have hereunto set my hand and seal the date and year first above written.

[Notarial Seal]

LLOYD A. FROST,  
Notary Public.

My commission expires Dec. 5th, 1913.

State of California,

City and County of San Francisco,—ss.

On this 12th day of November in the year one thousand nine hundred and nine, before me, P. J. Kennedy, a Notary Public, in and for said City and County, residing therein, duly commissioned and sworn, personally appeared H. H. Taylor and F. A. Hammersmith, known to me to be the President and Secretary respectively of Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, the corporations that executed the within *in* foregoing instrument, and to be the officers who executed the said instrument on behalf of said corporations therein named, and they acknowledged to me that such corporations executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal at my office in the said City and County of San [31] Francisco, the day and year last above written.

(Signed)

[Notarial Seal]

P. J. KENNEDY,  
Notary Public, in and for the City and County of  
San Francisco, State of California.

State of California,

City and County of San Francisco,—ss.

On this 12th day of November in the year One

Thousand Nine Hundred and Nine before me P. J. Kennedy, a Notary Public, in and for said City and County, residing therein, duly commissioned and sworn, personally appeared H. H. Taylor, and F. A. Hammersmith, known to me to be the President and Secretary, respectively, of Alaska Treadwell Gold Mining Company, the Corporation that executed the within and foregoing instrument, and to be the officers who executed the said instrument on behalf of said Corporation therein named, and they acknowledged to me that such Corporation executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal at my office in said City and County of San Francisco, the day and year last above written.

(Signed)

[Notarial Seal]

P. J. KENNEDY,

Notary Public in and for the City and County of  
San Francisco, State of California. [32]

CERTIFIED COPY OF RESOLUTION  
PASSED BY THE BOARD OF DIRECT-  
ORS OF ALASKA TREADWELL GOLD  
MINING COMPANY.

“Resolved that the proposed lease, dated October 14th, 1909, of certain real property particularly therein described and situate on and near Sheep Creek in the Harris Mining District, Alaska, made by and between OXFORD MINING COMPANY and ALASKA TREADWELL GOLD MINING COMPANY, ALASKA MEXICAN GOLD MINING COMPANY and ALASKA UNITED GOLD



MINING COMPANY, be and the same is hereby approved and accepted, and the President and Secretary are hereby authorized and directed, in the name of the company and as its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company.”

### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska Treadwell Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

In Witness Whereof I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska Treadwell Gold Mining Company.

### CERTIFIED COPY OF RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF ALASKA MEXICAN GOLD MINING COMPANY.

“Resolved that the proposed lease dated October 14th, 1909, of certain real property particularly therein described and situate on and near Sheep Creek in the Harris Mining District, Alaska, made by and between Oxford Mining Company and

Alaska Treadwell Gold Mining Company, Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby approved and accepted, and the President and Secretary are hereby authorized and directed, in the name of the Company and as its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company.”

#### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska Mexican Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

In Witness Whereof I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska Mexican Gold Mining Company.

#### CERTIFIED COPY OF RESOLUTION PASSED BY THE BOARD OF DIRECT- ORS OF ALASKA UNITED GOLD MINING COMPANY.

“Resolved that the proposed lease, dated October 14th, 1909, of [33] certain real property particularly therein described and situated on and near

Sheep Creek in the Harris Mining District, Alaska, made by and between Oxford Mining Company and Alaska Treadwell Gold Mining Company, Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby approved and accepted and the President and Secretary are hereby authorized and directed, in the name of the company and as its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company."

#### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska United Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

IN WITNESS WHEREOF I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska United Gold Mining Company.

Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

WHEREAS the International Trust Company,

a corporation, has reserved unto itself for the benefit of itself and various persons therein interested a lien upon the property described in the foregoing lease for the sum of \$36,376, to secure the costs, advances, and charges in connection with the foreclosure of certain trust deeds upon certain property in the District of Alaska, a part of which is described in the foregoing instrument.

NOW, THEREFORE, THIS INSTRUMENT WITNESSETH

That in consideration of the covenants contained in the foregoing agreement said International Trust Company for the purpose of binding the interest so held upon said property by said lien, assents, agrees and ratifies the execution of the foregoing lease with the Alaska Treadwell Gold Mining Company, et al., Party of the Second part, and agrees to substitute said lien upon any contract or contracts which may be made pursuant to the options contained in the said lease, so that the terms and provisions of said contract may be carried out.

Executed in triplicate.

Signed this 14th day of October, 1909.

[Corporate Seal]

INTERNATIONAL TRUST COMPANY,

By JNO. M. GRAHAM,

Pres.

HENRY L. JEWETT,

Sect.

Witness:

WALTER W. BLACK,

HAROLD LAWRENCE.



Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

Be it remembered that on the 14th day of October, 1909, before me, the undersigned Notary Public, in and for said county and State personally appeared John M. Graham and Henry L. Jewett, Secretary of the International Trust Company, a corporation organized under the laws of the State of Massachusetts, to me known to be the individuals described in and who executed the foregoing instrument, as such President and Secretary for and on behalf of said International Trust Company as Trustee for the mortgage bondholders [34] under said instrument described; the said Henry L. Jewett having affixed the seal of said corporation to said instrument and they severally acknowledged to me that he, John M. Graham as president, and he, the said Henry L. Jewett, as Secretary of said Corporation, executed the foregoing instrument for and on behalf of said corporation as the free and voluntary act and deed of said corporation as Trustees for the uses and purposes therein set forth.

Then the said Henry L. Jewett being by me first duly sworn on his oath states that he is the Secretary of said Corporation, is acquainted, is the custodian, and has in his possession the corporate seal of said corporation and that the seal hereinbefore affixed is the corporate seal of said corporation and was affixed by him as such Secretary by order of the Board of Directors of said Corporation.





II.

That thereafter further negotiations were had between the Oxford Mining Company and the defendant Corporations in relation [35] to the properties mentioned in the foregoing instrument, which said negotiations resulted in the execution of a further instrument in writing made between the parties, which said instrument is in words and figures as follows, to wit:

THIS INDENTURE, made this 22nd day of April, 1911, BETWEEN the OXFORD MINING COMPANY, a corporation, hereinafter called the party of the first part, and the Alaska Treadwell Gold Mining Company, a corporation, the Alaska Mexican Gold Mining Company, a corporation, and the Alaska United Gold Mining Company, a corporation, hereinafter called the parties of the second part;

WITNESSETH:

THAT WHEREAS, on the 14th day of October, 1909, the parties of the first and second parts above mentioned, entered into an indenture and agreement in words and figures as follows, to wit: [36]

THIS INDENTURE AND AGREEMENT made and entered into this 14th day of October, 1909, by and between OXFORD MINING COMPANY hereinafter called the lessor and the ALASKA TREADWELL GOLD MINING Company, the Alaska Mexican Gold Mining Company and the Alaska United Gold Mining Company hereinafter called the lessees.

WITNESSETH,—First, the lessor has this date

and does by these presents lease unto the lessees all of the following described real property situated on and near Sheep Creek in the Harris Mining District, District of Alaska to wit:

The Mexico Mill-site U. S. Mineral Entry No. 25, lot 71B. The Bellvidere Mill-site U. S. Mineral Entry No. 25 lot 72B. The Jumbo Mill-site U. S. Mineral Entry No. 60, lot No. 260. Also that certain piece or parcel of land beginning at a stake identical with post No. 2 Jumbo Mill-site U. S. Survey No. 260 on the meander line of Gastineau Channel, thence first course along the meander line of Gastineau Channel at ordinary high water mark N. 52.00' W 54 feet to stake No. 2; thence second course N. 48° 15' E. 200 feet to stake No. 3; thence S. 52.00' E. 54 feet to the N. W. side line of Jumbo Mill-site U. S. Survey No. 260 to stake No. 4; thence S. 46 15' West along the Northwest side line Jumbo Mill-site U. S. Survey No. 260, 200 feet to stake No. 1, the place of beginning containing an area of one quarter of an acre more or less courses expressed from the true meridian, Mag. Var. 29.30'; and also that certain water right known as the Sheep Creek Water Right and located on Sheep Creek about three quarters of a mile from its mouth, together with the flume and pipe line connecting the same with the beach near the mill at the mouth of the said Sheep Creek, also the sam-mill, boarding house, lumber sheds, wharf landing, mill dam flumes, penstocks, water-wheels, and all other machinery and appliances used in connection with said saw-mill, situated near the mouth of said

Sheep Creek, together with all machinery, tools, equipment, plants of every kind and description now upon said property for a term of ten (10) years from the date hereof at a monthly [37] rental of One Hundred and Twenty-five (\$125.00) Dollars per month payable in gold coin of the United States on the first day of each month during the term of said lease at the office of the lessees at Treadwell, Alaska; and it is hereby agreed, that if any rent shall be due and unpaid, or if default shall be made in any of the covenants herein contained, that it shall be lawful for the lessor to re-enter said premises and remove all persons therefrom, and the lessees do hereby covenant, promise and agree to pay the lessor the said rent in the manner hereinbefore specified, and not to let or under let the whole or any part of said premises without a written consent of the lessor, nor to assign this lease or any part thereof without said written consent, and at the expiration of said term the party of the second part will quit and surrender said premises in as good state and condition as the same now are.

It is the intention of the lessees to erect, equip and maintain upon said premises a water-power plant of substantial size and efficiency for the generation of electric power, and if at any time after two (2) years from the date hereof the lessor or its assigns shall elect to take a current of not to exceed three hundred (300) electric horse-power which shall be taken from and at the generating plant to be installed upon the leased premises hereinbefore described, the lessees undertake covenant and agree to deliver said



current to the lessor or its assigns upon the execution and delivery by the lessor or its assigns to the lessee of a deed or deeds conveying said leased property herein described to the party of the second part. If prior to the expiration of nine years from the date hereof the lessor does not elect to convey to lessees or their assigns the property herein leased and accept in full consideration therefor the right to the use of the three hundred (300) electric horse-power hereinbefore mentioned, the lessees may at their option prior to the expiration of the ten (10) years provided in this lease purchase the property herein leased absolutely from the lessor by paying to the lessor the sum of Twenty-five Thousand [38] Dollars (25,000.) in gold coin of the United States; and the lessor covenants and agrees upon tender of said sum of Twenty-five Thousand Dollars (\$25,000.00) to execute and deliver such deeds of conveyance to the property herein leased as hereinbefore specified, excepting only as to the title to (1) the one quarter acre tract hereinbefore described and (2) the premises occupied and used by the existing wharf of the lessor to both of which the lessor now asserts only possessory titles. The lessees may at their own cost and expense undertake to perfect the said titles and should lessee wish so to do the lessor shall lend all proper assistance in its power including the using of its name, and should the said titles be so perfected to the said premises or either of them they shall become the property of the lessor and remain covered by this lease and subject to all terms and conditions thereof.



The covenants herein contained shall be construed as running with the land and as a charge thereon, so, that any successor or successors, in interest to the lessor and or lessees who may acquire any interest in and to the titles to the said land shall be bound by this conveyance in the same manner as if they had executed this agreement; and the lessees hereof may require at their option that the property herein described be conveyed by the lessor to a responsible Trustee for the purpose of carrying out the terms of this agreement, or that deeds and conveyances covering the property herein leased be placed in escrow so as to ensure delivery of the same if required under the provisions of any of the covenants of this lease.

If neither of the options herein provided for are accepted by either the lessor or lessees then the property and lights herein described with all the improvements that are or that may hereafter be placed on the said premises shall be and become the property of the lessor.

The provisions herein as to the delivery of three hundred (300) horse power at the generating plant to be installed on the premises herein described contemplates the delivery of an uninterrupted current, but the lessees shall not be liable for damages that may arise from operating and physical causes beyond its control.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals the day and

year first above written. (Executed in triplicate.)

Witness:

HAROLD LAWRENCE.

WALTER W. BLACK.

OXFORD MINING COMPANY.

By WALLACE HACKETT,

President.

And HENRY ENDICOTT,

Treasurer.

[Seal—Oxford Mining Company.]

ALASKA TREADWELL GOLD MINING  
COMPANY.

By H. H. TAYLOR,

President,

F. A. HAMMERSMITH,

Secretary.

ALASKA MEXICAN GOLD MINING  
COMPANY.

By H. H. TAYLOR,

President,

F. A. HAMMERSMITH,

Secretary.

ALASKA UNITED GOLD MINING COM-  
PANY.

By H. H. TAYLOR,

President,

F. A. HAMMERSMITH,

Secretary.

[Seal—Alaska Treadwell Gold Mining Co.]

[39]

[Seal—Alaska Mexican Gold Mining Co.]

[Seal—Alaska United Gold Mining Co.]

Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

Be it remembered that on this 14th day of October, 1909, before me, the undersigned, a Notary Public, in and for said County and State, personally appeared Wallace Hackett, President, and Henry Endicott, Treasurer, of the Oxford Mining Company, a corporation, organized under the laws of the State of Maine, to me known to be the individuals described in and who executed the foregoing instrument as such president and such Treasurer; and said Henry Endicott having affixed the seal of said Corporation to said instrument, *the* severally acknowledged to me that he, Wallace Hackett, as President and he, Henry Endicott, as Treasurer, of said Corporation executed the foregoing instrument for and on behalf of said Corporation, as the free and voluntary act of said Corporation for the uses and purposes therein set forth. Then the said Henry Endicott, by me being first duly sworn, on his oath states that he is the Treasurer of said Corporation, is acquainted and is the custodian, and has in his possession the corporate seal of said Corporation and that the seal hereinbefore affixed is the corporate seal of said Corporation and was affixed by him as such Treasurer by order of the Board of Directors of said Corporation.

In Witness Whereof I have hereunto set my hand and seal the date and year first above written.

[Notarial Seal]

(Signed) LLOYD A. FROST,  
Notary Public.

My commission expires Dec. 5th, 1913.

State of California,  
City and County of San Francisco,—ss.

On this 12th day of November, in the year one thousand nine hundred and nine, before me, P. J. Kennedy, a Notary Public, in and for the said City and County, residing therein, duly commission and sworn, personally appeared H. H. Taylor and F. A. Hammersmith known to me to be the President and Secretary respectively of Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, the corporations that executed the within and foregoing instrument, and to be the officers who executed the said instrument on behalf of said Corporations therein named, and they acknowledged to me that such corporations executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal at my office in the said City and County of San Francisco the day and year last above written.

[Notarial Seal]

(Signed) P. J. KENNEDY,  
Notary Public in and for the City and County of  
San Francisco, State of Calif.

State of California,  
City and County of San Francisco,—ss.

On this 12th day of November in the year One Thousand Nine Hundred and Nine, before me, P. J. Kennedy, a Notary Public, [40] in and for said City and County, residing therein, duly commission and sworn, personally appeared H. H. Taylor and F. A. Hammersmith, know to me to be the

President and Secretary, respectively, of Alaska Treadwell Gold Mining Company, the corporation that executed the within and foregoing instrument, and to be the officers who executed the said instrument on behalf of said corporation therein named, and they acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal at my office in said City and County of San Francisco, the day and year last above written.

[Notarial Seal]

(Signed) P. J. KENNEDY,  
Notary Public in and for the City and County of  
San Francisco, State of California. [41]

**CERTIFIED COPY OF RESOLUTION PASSED  
BY THE BOARD OF DIRECTORS OF  
ALASKA TREADWELL GOLD MINING  
COMPANY.**

“Resolved that the proposed lease, dated October 14th, 1909, of certain real property particularly therein described and situate on and near Sheep Creek in the Harris Mining District, Alaska, made by and between Oxford Mining Company and Alaska Treadwell Gold Mining Company, Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby approved and accepted, and the President and Secretary are hereby authorized and directed, in the name of the Company and as its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company.”



**CERTIFICATE OF SECRETARY.**

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska Treadwell Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

IN WITNESS WHEREOF I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska Treadwell Gold Mining Company.

**CERTIFIED COPY OF RESOLUTION PASSED  
BY THE BOARD OF DIRECTORS OF  
ALASKA MEXICAN GOLD MINING COM-  
PANY.**

“Resolved that the proposed lease dated October 14th, 1909, of certain real property particularly therein described and situate on and near Sheep Creek in the Harris Mining District, Alaska, made by and between Oxford Mining Company and Alaska Treadwell Gold Mining Company, Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby approved and accepted, and the President and Secretary are hereby authorized and directed, in the name of the Company and as its act and deed and under its

corporate seal, to execute and deliver said lease to Oxford Mining Company.”

### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska Mexican Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

In Witness Whereof I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska Mexican Gold Mining Company.

### CERTIFIED COPY OF RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF ALASKA UNITED GOLD MINING COM- PANY.

“Resolved that the proposed lease, dated October 14, 1909, of [42] certain real property particularly therein described and situated on and near Sheep Creek in the Harris Mining District, Alaska, made by and between Oxford Mining Company and Alaska Treadwell Gold Mining Company, Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby approved and accepted and the President and Secretary are hereby authorized and directed, in the name

of the company and as its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company.”

### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska United Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

In Witness Whereof I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska United Gold Mining Company.  
Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

WHEREAS the International Trust Company, a corporation, has reserved unto itself for the benefit of itself and various persons therein interested a lien upon the property described in the foregoing lease for the sum of \$36,376. to secure the costs, advances, and charges in connection with the foreclosure of certain trust deeds upon certain property in the District of Alaska, a part of which is described in the foregoing instrument.

NOW THEREFORE THIS INSTRUMENT WITNESSETH That in consideration of the cov-

enants contained in the foregoing agreement said International Trust Company for the purpose of binding the interest so held upon said property by said lien assents, agrees and ratifies the execution of the foregoing lease with the Alaska Treadwell Gold Mining Company et al., party of the Second part, and agrees to substitute said lien upon any contract or contracts, which may be made pursuant to the options contained in the said lease, so that the terms and provisions of said contract may be carried out. (Executed in triplicate.)

Signed this 14th day of October, 1909.

INTERNATIONAL TRUST COMPANY.

[Corporate Seal] By JNO. M. GRAHAM,  
Pres.  
HENRY L. JEWETT,  
Sect.

Witness:

WALTER W. BLACK.  
HAROLD LAWRENCE.

Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

Be it remembered that on the 14th day of October, 1909, before me, the undersigned Notary Public, in and for said County and State personally appeared John M. Graham and Henry L. Jewett, Secretary of the International Trust Company, a corporation organized under the laws of the State of Massachusetts, to me known to be the individuals described in and who executed the foregoing instrument, as such President and Secretary for and on behalf of said

International Trust Company as Trustee for the mortgage bondholders [43] under said instrument described; the said Henry L. Jewett having affixed the seal of said corporation to said instrument and they severally acknowledged to me that he, John M. Graham as president, and he, the said Henry L. Jewett, as Secretary of said Corporation, executed the foregoing instrument for and on behalf of said corporation as the free and voluntary act and deed of said corporation as Trustees for the uses and purposes therein set forth.

Then the said Henry L. Jewett being by me first duly sworn on his oath states that he is the Secretary of said Corporation, is acquainted, is the custodian, and has in his possession the corporate seal of said corporation and that the seal hereinbefore affixed is the corporate seal of said corporation and was affixed by him as such Secretary by order of the Board of Directors of said Corporation.

IN WITNESS WHEREOF I have hereunto set my hand and official seal the day and year first above written.

[Notarial Seal]

(Signed) LLOYD A. FROST,  
Notary Public.

My commission expires Dec. 5th, 1913.

Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

WHEREAS the International Trust Company a corporation has reserved a lien upon the property



described in the foregoing lease together with other property.

Now for the purpose of further securing said lien, the undersigned lessor in the foregoing instrument, by order of its Board of Directors, hereby assigns the rentals due or to become due under the foregoing lease to the International Trust Company to be applied, first upon the payment of interest of the \$15,000. item a compensation reserved in favor of said Trust Company at the rate of six per cent (6% per annum—and second that the balance of said moneys be applied pro rata upon the other items described in said lien so reserved.

Dated this 14th day of October, 1909, at Boston, Mass.

(Signed) OXFORD MINING COMPANY,  
By WALLACE HACKETT,  
President.

Attest:

HENRY ENDICOTT,  
Secretary.

—which said agreement was duly filed for record at 1 o'clock P. M. on the 17th day of October, 1910, and duly recorded in Book 19 Miscellaneous, at page 2 of the records of the Juneau Recording District, wherein the property mentioned in said indenture and agreement is situated:

AND WHEREAS, on or about the 17th day of October, 1910, the parties of the second part had finished the erection and equipment upon the premises described in the said indenture and agreement of a water-power plant of substantial size and

efficiency pursuant to the provisions of said indenture and agreement and had expended in the erection and equipment of said water-power plant a sum in excess of one Hundred Thousand (\$100,000) Dollars:

AND WHEREAS, the said water-power plant was completed about one year sooner than contemplated in the said indenture and agreement of October 14, 1909, which allowed a period of two years from the date of said agreement for the erection of said water-power plant: [44]

AND WHEREAS, thereafter on the 31st day of October, 1909, the Oxford Mining Company, party of the first part therein, duly elected to take the electric current provided for in the said indenture and agreement, which said election was accepted and agreed to by the parties of the second part hereinbefore mentioned on the said 31st day of October, 1910;

NOW, THEREFORE, under and pursuant to the provisions of the indenture and agreement of October 14, 1909, and the election of the party of the first part of October 31, 1910, the party of the first part, for and in consideration of the provisions of the said indenture and agreement of October 14, 1909, and pursuant to its election of October 31st, 1910; and in further consideration of the sum of One Hundred Thousand (\$100,000) Dollars expended in the erection and equipment of a water power plant of sufficient size and efficiency for the generation of electric power by the parties of the second part hereto, receipt of all of which consid-

erations above set forth is hereby acknowledged by the party of the first part, does by these presents grant, bargain and sell unto the parties of the second part, and to their heirs, assigns and successors in interest, forever, all of that certain property described in the said indenture and agreement of October 14, 1909, hereinbefore set forth, lying and being situate on and near Sheep Creek in the Harris Mining District, District of Alaska.

TOGETHER *will* all the tenements, hereditaments and appurtenances hereunto belonging or appertaining, and the reversion and reversions, remainder and remainders rents, issues and profits thereof, it being the intention of this instrument in conveying to comply in full with the undertaking on the part of the Oxford Mining Company made on the 14th day of October, 1909.

TO HAVE AND TO HOLD said premises together with the appurtenances unto the said parties of the second part and to their heirs, assigns and successors in interest forever.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals the day and year first above written.

(Signed) OXFORD MINING COMPANY,  
By WALLACE HACKETT,  
President.

[Corporate Seal] HENRY ENDICOTT,  
Treasurer.

Signed, sealed and delivered in the presence of  
LEWIS P. SHACKLEFORD,  
L. W. LAWRENCE (or L. W. LANS-  
MORE).

Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

It will be remembered that on the twenty-second day of April, 1911, before me Alexander L. Pelkey, Notary Public in and for said State, County and City, personally appeared WALLACE HACKETT, president and HENRY ENDICOTT, treasurer of the Oxford Mining Company, a corporation organized under the laws of the State of Maine, known to me to be the individuals described in and who executed the foregoing instrument as said President and Treasurer, and the said Henry Endicott, having affixed the seal of said corporation to said instrument, they severally acknowledged to me that WALLACE HACKETT as President and HENRY ENDICOTT as Treasurer of the said corporation executed the foregoing instrument for and on behalf of said corporation to be the free and voluntary act of said corporation for the uses and purposes therein set forth. Then said HENRY ENDICOTT, being first duly sworn, on his oath states that he is the Treasurer of said corporation and he is acquainted with, is custodian of and has in his possession the corporate seal of said corporation, and that the seal [45] hereinbefore affixed is the seal of said corporation and was affixed by him as said Treasurer by order of the Board of Directors of said Corporation.

IN WITNESS WHEREOF I have herein set my

hand and official seal the day and year first above written.

[Notarial Seal]

(Signed) ALEXANDER L. PELKEY,  
Notary Public. [46]

### III.

That thereafter other and further negotiations were had by and between the Oxford Mining Company and the defendant corporations in relation to the property rights above referred to, which said negotiations resulted in the execution between the parties of another and further instrument, which is in words and figures as follows, to wit: [47]

THIS AGREEMENT, made this 22d day of April, 1911, BETWEEN the Oxford Mining Company, a corporation, party of the first part, and the Alaska Treadwell Gold Mining Company, a corporation, the Alaska Mexican Gold Mining Company, a corporation, and the Alaska United Gold Mining Company, a corporation, parties of the second part: WITNESSETH:

THAT WHEREAS, on the 14th day of October, 1909, the parties hereto entered into an indenture and agreement in words and figures as follows, to wit: [48]

THIS INDENTURE AND AGREEMENT made and entered into this 14th day of October, 1909, by and between OXFORD MINING COMPANY hereinafter called the lessor and the Alaska Treadwell Gold Mining Company, the Alaska Mexican Gold Mining Company and the Alaska United Gold Mining Company hereinafter called the lessees.

WITNESSETH,—First, the lessor has this date



and does by these presents lease unto the lessees all of the following described real property situated on and near Sheep Creek in the Harris Mining District, District of Alaska to wit:

The Mexico Mill-site U. S. Mineral Entry No. 25, lot 71B. The Bellvidere Millsite U. S. Mineral Entry No. 25, Lot 72B. The Jumbo Mill-site U. S. Mineral Entry No. 60, lot No. 260. Also that certain piece or parcel of land beginning at a stake indential with post No. 2 Jumbo Mill-site U. S. Survey No. 260 on the meander line of Gastineau Channel, thence first course along the meander line of Gastineau Channel at ordinary high water mark N. 52.00' W 54 feet to stake No. 2; thence second course N. 48° 15' E. 200 feet to stake No. 3; thence S. 52.00' E. 54 feet to the N. W. side line of Jumbo Mill-site U. S. Survey No. 260 to stake No. 4; thence S. 46 15' West along the Northwest side line Jumbo Mill-site U. S. Survey No. 260, 200 feet to stake No. 1, the place of beginning containing an area of one quarter of an acre more or less courses expressed from the true meridian, Mag. Var. 29.30'; and also that certain water right known as the Sheep Creek Water Right and located on Sheep Creek about three quarters of a mile from its mouth, together with the flume and pipe-line connecting the same with the beach near the mill at the mouth of the said Sheep Creek, also the saw-mill, boarding house, lumber sheds, wharf landing, mill dam flumes, pen-stocks, water-wheels, and all other machinery and appliances used in connection with said saw-mill, situated near the mouth of said Sheep Creek, to-

gether with all machinery, tools, equipment, plants of every kind and description now upon said property for a term of ten (10) years from the date hereof at a monthly rental of One Hundred and Twenty-five (\$125.00) Dollars per month, payable in gold coin of the United States on the first day of each month during the term of said lease at the office of the lessees at Treadwell, Alaska; and it is hereby agreed, that if any rent shall be due and unpaid, or if default shall be made in any of the covenants herein contained, that it shall be lawful for the lessor to re-enter said premises and remove all persons therefrom, and the lessees do hereby covenant, promise and agree to pay the lessor the said rent in the manner hereinbefore specified, and not to let or under let the whole or any part of said premises without a written consent of the lessor, nor to assign this lease or any part thereof without said written consent, and at the expiration of said term the party of the second part will quit and surrender said premises in as good state and condition as the same now are.

It is the intention of the Lessees to erect, equip and maintain upon said premises a water-power plant of substantial size and efficiency for the generation of electric power, and if at any time after two (2) years from the date hereof the lessor or its assigns shall elect to take a current of not to exceed three hundred (300) electric horse-power which shall be taken from and at the generating plant to be installed upon the leased premises hereinbefore described, the lessees undertake covenant and agree

to deliver said current to the lessor or its assigns upon the execution and delivery by the lessor or its assigns to the lessee of a deed or deeds conveying said leased property herein described to the party of the second part. If prior to the expiration of nine years from the date hereof the lessor does not elect to convey to lessees or their assigns the property herein leased and accept in full consideration therefor the right to the use of the three hundred (300) electric horse-power hereinbefore mentioned, the lessees may at [49] their option prior to the expiration of the ten (10) years provided in this lease purchase the property herein leased absolutely from the lessor by paying to the lessor the sum of Twenty-five Thousand Dollars (\$25,000) in gold coin of the United States; and the lessor covenants and agrees upon tender of said sum of Twenty-five Thousand Dollars (\$25,000) to execute and deliver such deeds of conveyance to the property herein leased as hereinbefore specified, excepting only as to the title to (1) the one quarter acre tract hereinbefore described and (2) the premises occupied and used by the existing wharf of the lessor to both of which the lessor now asserts only possessory titles. The lessees may at their own cost and expense undertake to perfect the said titles and should lessee wish so to do the lessor shall lend all proper assistance in its power including the using of its name, and should the said titles be so perfected to the said premises or either of them they shall become the property of the lessor and remain covered by this lease and subject to all terms and

conditions thereof.

The covenants herein contained shall be construed as running with the land and as a charge thereon, so, that any successor or successors in interest to the lessor and or lessees who may acquire any interest in and to the titles to the said land shall be bound by this conveyance in the same manner as if they had executed this agreement; and the lessees hereof may require at their option that the property herein described be conveyed by the lessor to a responsible Trustee for the purpose of carrying out the terms of this agreement, or that deeds and conveyances covering the property herein leased be placed in escrow so as to ensure delivery of the same if required under the provisions of any of the covenants of this lease.

If neither of the options herein provided for are accepted by either the lessor or lessees then the property and rights herein described with all the improvements that are or that may hereafter be placed on the said premises shall be and become the property of the lessor.

The provisions herein as to the delivery of three hundred (300) horse-power at the generating plant to be installed on the premises herein described contemplates the delivery of an uninterrupted current, but the lessees shall not be liable for damages that may arise from operating and physical causes beyond its control.

In witness whereof the parties hereto have hereunto set their hands and seals the day and year first

above written. (Executed in Triplicate.)

Witness:

HAROLD LAWRENCE.

WALTER W. BLACK.

OXFORD MINING COMPANY.

By WALLACE HACKETT,  
President.

And HENRY ENDICOTT,  
Treasurer,

[Seal—Oxford Mining Company.]

ALASKA TREADWELL GOLD MINING  
COMPANY.

By H. H. TAYLOR,  
President.

F. A. HAMMERSMITH,  
Secretary.

ALASKA MEXICAN GOLD MINING  
COMPANY.

By H. H. TAYLOR,  
President.

F. A. HAMMERSMITH,  
Secretary.

ALASKA UNITED GOLD MINING COM-  
PANY.

H. H. TAYLOR,  
President.

F. A. HAMMERSMITH,  
Secretary.

[Seal—Alaska Treadwell Gold Mining Co.]

[Seal—Alaska Mexican Gold Mining Co.]

[Seal—Alaska United Gold Mining Co.]



Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

Be it remembered that on this 14th day of October, 1909, before me, the undersigned, a Notary Public, in and for said County and State, personally appeared Wallace Hackett, President, and Henry Endicott, Treasurer, of the Oxford Mining Company, a corporation, organized under the laws of the State of Maine, to me known to be the individuals described in and who executed the foregoing instrument as such President and such Treasurer; and said Henry Endicott having affixed the seal of said corporation to said instrument, *the* severally acknowledged to me that he, Wallace Hackett, as President and he, Henry Endicott, as Treasurer, of said Corporation executed the foregoing instrument for and on behalf of said Corporation, as the free and voluntary act of said Corporation for the uses and purposes therein set forth. Then the said Henry Endicott, by me being first duly sworn, on his oath states that he is the Treasurer of said Corporation, is acquainted and is the custodian, and has in his possession the corporate seal of said Corporation and that the seal hereinbefore affixed is the corporate seal of said Corporation and was affixed by him as such Treasurer by order of the Board of Directors of said Corporation.

In witness Whereof I have hereunto set my hand and seal the date and year first above written.

[Notarial Seal.]

(Signed)    LLOYD A. FROST,  
Notary Public.

My commission expires Dec. 5th, 1913.

State of California,

City and County of San Francisco,—ss.

On this 12th day of November, in the year one thousand nine hundred and nine, before me, P. J. Kennedy, a Notary Public, in and for the said City and County, residing therein, duly commissioned and sworn, personally appeared H. H. Taylor and F. A. Hammersmith known to me to be the President and Secretary respectively of Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, the corporation that executed the within and foregoing instrument, and to be the officers who executed the said instrument on behalf of said Corporations therein named, and they acknowledged to me that such corporations executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal at my office in the said City and County of San Francisco, the day and year last above written.

[Notarial Seal.]

(Signed)    P. J. KENNEDY,  
Notary Public in and for the City and County of San  
Francisco, State of Calif.

State of California,

City and County of San Francisco,—ss.

On this 12th day of November in the year One

Thousand Nine Hundred and Nine, before me, P. J. Kennedy, a Notary Public, [51] in and for said City and County, residing therein, duly commission and sworn, personally appeared H. H. Taylor and F. A. Hammersmith, known to me to be the President and Secretary, respectively, of Alaska Treadwell Gold Mining Company, the corporation that executed the within and foregoing instrument, and to be the officers who executed the said instrument on behalf of said Corporation therein named, and they acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal at my office in said City and County of San Francisco, the day and year last above written.

[Notarial Seal.]

(Signed) P. J. KENNEDY,

Notary Public in and for the City and County of San Francisco, State of California. [52]

CERTIFIED COPY OF RESOLUTION PASSED  
BY THE BOARD OF DIRECTORS OF  
ALASKA TREADWELL GOLD MINING  
COMPANY.

“Resolved that the proposed lease, dated October 14th, 1909, of certain real property particularly therein described and situate on and near Sheep Creek in the Harris Mining District, Alaska, made by and between Oxford Mining Company and Alaska Treadwell Gold Mining Company, Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby

approved and accepted, and the President and Secretary are hereby authorized and directed, in the name of the Company and as its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company.”

#### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska Treadwell Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

IN WITNESS WHEREOF I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal.]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska Treadwell Gold Mining Company.

#### CERTIFIED COPY OF RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF ALASKA MEXICAN GOLD MINING COMPANY.

“Resolved that the proposed lease dated October 14th, 1909, of certain real property particularly therein described and situate on and near Sheep Creek in the Harris Mining District, Alaska, made by and between Oxford Mining Company and Alaska Treadwell Gold Mining Company, Alaska

Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby approved and accepted, and the President and Secretary are hereby authorized and directed, in the name of the Company and of its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company.”

### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska Mexican Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of the Board of Directors.

IN WITNESS WHEREOF I have hereunto set my hand as such Secretary and affixed the Corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal.]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska Mexican Gold Mining Company.

### CERTIFIED COPY OF RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF ALASKA UNITED GOLD MINING COM- PANY.

“Resolved that the proposed lease, dated October 14th, 1909, of [53] certain real property particularly therein described and situated on and near Sheep Creek in the Harris Mining District, Alaska,



made by and between Oxford Mining Company and Alaska Treadwell Gold Mining Company, Alaska Mexican Gold Mining Company and Alaska United Gold Mining Company, be and the same is hereby approved and accepted and the President and Secretary are hereby authorized and directed, in the name of the company and as its act and deed and under its corporate seal, to execute and deliver said lease to Oxford Mining Company."

#### CERTIFICATE OF SECRETARY.

I, F. A. Hammersmith, hereby certify that I am the Secretary of Alaska United Gold Mining Company; that the foregoing Resolution is a full, true and correct copy of a Resolution duly passed and adopted by the Board of Directors of said Company at a meeting held on the 11th day of November, 1909, as the same is now recorded on the minutes of the meeting of said Board of Directors.

IN WITNESS WHEREOF I have hereunto set my hand as such Secretary and affixed the corporate seal of said Company, this 11th day of November, 1909.

[Corporate Seal]

(Signed) F. A. HAMMERSMITH,  
Secretary of Alaska United Gold Mining Company.  
Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

WHEREAS the International Trust Company, a corporation, has reserved unto itself for the benefit of itself and various persons therein interested a lien

upon the property described in the foregoing lease for the sum of \$36,376, to secure the costs, advances, and charges in connection with the foreclosure of certain trust deeds upon certain property in the District of Alaska, a part of which is described in the foregoing instrument.

NOW THEREFORE THIS INSTRUMENT WITNESSETH.

That in consideration of the covenants contained in the foregoing agreement said International Trust Company for the purpose of binding the interest so held upon said property by said lien, assents, agrees and ratifies the execution of the foregoing lease with the Alaska Treadwell Gold Mining Company, et al., Party of the Second part, and agrees to substitute said lien upon any contract or contracts which may be made pursuant to the options contained in the said lease, so that the terms and provisions of said contract may be carried out.

Executed in triplicate.

Signed this 14th day of October, 1909.

[Corporate Seal.]

INTERNATIONAL TRUST COMPANY.

By JNO. M. GRAHAM,

Pres.

HENRY L. JEWETT,

Sect.

Witness:

WALTER W. BLACK.

HAROLD LAWRENCE.

Commonwealth of Massachusetts,  
County of Norfolk,  
City of Boston,—ss.

Be it remembered that on the 14th day of October, 1909, before me, the undersigned Notary Public, in and for said county and State personally appeared John M. Graham and Henry L. Jewett, Secretary of the International Trust Company, a corporation organized under the laws of the State of Massachusetts, to me known to be the individuals described in and who executed the foregoing instrument, as such President and Secretary for and on behalf of said International Trust Company as Trustee for the mortgage bondholders [54] under said instrument described; the said Henry L. Jewett having affixed the seal of said corporation to said instrument and they severally acknowledged to me that he, John M. Graham as president, and he, the said Henry L. Jewett, as Secretary of said Corporation, executed the foregoing instrument for and on behalf of said corporation as the free and voluntary act and deed of said corporation as Trustees for the uses and purposes therein set forth.

Then the said Henry L. Jewett being by me first duly sworn on his oath states that he is the Secretary of said Corporation, is acquainted, is the custodian, and has in his possession the corporate seal of said corporation and that the seal hereinbefore affixed is the corporate seal of said corporation and was affixed by him as such Secretary by order of the Board of Directors of said Corporation.

IN WITNESS WHEREOF I have hereunto set my hand and official seal the day and year first above written.

[Notarial Seal]

(Signed) LLOYD A. FROST,  
Notary Public.

My commission expires Dec. 5th, 1913.

Commonwealth of Massachusetts,  
County of Suffolk,  
City of Boston,—ss.

WHEREAS the International Trust Company a corporation has reserved a lien upon the property described in the foregoing lease together with other property.

Now for the purpose of, further securing said lien, the undersigned lessor in the foregoing instrument, by order of its Board of Directors, hereby assigns the rentals due or to become due under the foregoing lease to the International Trust Company to be applied, first upon the payment of interest of the \$15,000. item of compensation reserved in favor of said Trust Company at the rate of six per cent (6%) per annum—and second that the balance of said moneys be applied pro rata upon the other items described in said lien so reserved.

Dated this 14th day of October, 1909, at Boston, Mass.

(Signed) OXFORD MINING COMPANY.  
By WALLACE HACKETT,  
President.

Attest:

HENRY ENDICOTT,  
Secretary. [55]

AND WHEREAS, thereafter on the 31st day of October, 1910, the water power plant provided for in the fourth paragraph of said agreement was duly erected and equipped prior to that time, and the party of the first part duly elected to take the current of electric power provided for in said indenture and agreement of October 14, 1909, which said election was agreed and consented to by the parties of the second part;

AND WHEREAS, thereafter in the month of January, 1911, a certain instrument purported to have been executed by Joseph T. Gilbert, party of the first part, and Alaska Perseverance Mining Company, a corporation, party of the second part, was spread on the records of the Juneau Mining District, and is in words and figures following, to-wit: [56]

THIS INDENTURE made this 3rd day of December, 1910, between Joseph T. Gilbert, of Gilbertsville, Otaega County, State of New York, party of the first part, and the Alaska Perseverance Mining Company, a corporation organized and existing under the laws of the State of New York, party of the second part;

WITNESSETH:

That the said party of the first part for and in consideration of One Dollar and other good and valuable consideration, the receipt whereof is hereby acknowledged, does by these presents grant; bargain; sell; remise, release, convey and confirm to the said party of the second part, his successors and assigns the property described in the following agreement.

THIS AGREEMENT made and entered into this seventeenth day of June, A. D. 1897, by and between



Joseph T. Gilbert, of the City of Milwaukee, State of Wisconsin, party of the one part, and the Nowell Gold Mining Company, a corporation organized under the laws of the State of Maine, and doing business in the District of Alaska, the party of the other part.

WITNESSETH:

That whereas the said Joseph T. Gilbert has sold by deed given June 16, 1897, to the said Nowell Gold Mining Company, a certain mill site, water rights, sawmill, and appliances, situate at Sheep Creek in the Harris Mining District, District of Alaska, for the sum of Twenty-five Thousand (\$25,000) dollars, and other good and valuable considerations hereinafter specifically set forth.

Now therefore, it is understood by and between the parties hereto that in case the said Joseph T. Gilbert, his heirs or assigns, should at any time desire to develop by tunnel, or otherwise, or to operate any of the property, formerly owned by the Juneau Mining and Manufacturing Company, that he and they shall have the right and preference to take and use any surplus water not required by the said Nowell Gold Mining Company for use in operating their own properties at Sheep Creek and in Silver Bow Basin in said District; that he or they may draw the surplus water from any point of flumes or pipe lines belonging to said Company, providing that it may be done without expense to the said Nowell Gold Mining Company, and that it shall not interfere with the operations of the properties, or the business of said Company; it is further understood and agreed that

the said Nowell Gold Mining Company shall have the right and privilege to sell or dispose of any power to other parties arising from said surplus water when the same shall not be needed or required by the said Joseph T. Gilbert, his heirs or assigns, in operating any plant that may be erected by him, his heirs or assigns, in working or developing his properties acquired from the Juneau Mining and Manufacturing Company. It is further hereby stipulated and agreed by and between the parties hereto, that in case of sale by the Nowell Gold Mining Company, of its mines, mills, millsites, and water rights, or any part of same, situated at Sheep Creek and in Silver Bow Basin, in the District aforesaid, to any person, persons or corporations, that the said Nowell Gold Mining Company shall not have the right to dispose the said water right hereby acquired from the said Joseph T. Gilbert, to any person, persons or corporations, other than for the purpose of operating the property held and owned by the said Nowell Gold Mining Company at Sheep Creek in the District aforesaid, at the time of said sale, provided that said Joseph T. Gilbert shall require the use [57] of said water or the power generated thereby.

It is further understood and agreed by the parties hereto that the said Joseph T. Gilbert, his heirs or assigns shall be entitled to use for millsite or power purposes a frontage of not more than four hundred (400) feet commencing at post Number two (2) of that certain piece or parcel of land formerly held and owned by one Kittie Richardson, adjoining the Jumbo Mill-site and extending thence along the beach

in a southeasterly direction four hundred feet and extending back from the beach three hundred thirty-one and four tenths ( $331\frac{4}{10}$ ) feet.

It is further understood and agreed by and between the parties hereto that the said Joseph T. Gilbert, his heirs or assigns shall have a right of way over and upon the land of said Nowell Gold Mining Company situate in the vicinity of Sheep Creek, District of Alaska, and that the said Nowell Gold Mining Company shall have a right of way over and upon the premises comprising four hundred (400) feet in length by three hundred thirty-one and four tenths ( $331\frac{4}{10}$ ) feet reserved by the said Joseph T. Gilbert as herein set forth.

It is further understood and agreed by and between the parties hereto that the said Joseph T. Gilbert shall have the use and benefit as well as the possession of that certain saw mill known as the Sheep Creek saw mill and situate near the mouth of Sheep Creek up to and until January 1, 1900, and that he shall have for the purpose of operating and running said mill all the water necessary from said Sheep Creek flume and pipe line to operate said mill; or in the event of electric power to replace said water, then the said Nowell Gold Mining Company shall furnish, free of cost to the said Joseph T. Gilbert, all the power necessary to operate the said mill.

It is further understood and agreed by and between the parties hereto that that certain building and machinery thereto used as a dry house, situate near the saw mill, is the property of William T. Iliff, and is no way effected by the sale from the said Gilbert

to the said Nowell Gold Mining Company. It is further understood and agreed by and between the parties hereto that in case the said saw mill shall be destroyed by fire that neither party shall be held responsible, one to the other. It is mutually understood and agreed by and between the parties that the water and ground privileges in favor of the said Joseph T. Gilbert are an essential and integral part of this contract and that the Nowell Gold Mining Company obligates itself and assigns to aid and assist without expense to itself in every way possible the said Joseph T. Gilbert to the use of such privileges.

IN WITNESS WHEREOF the said Joseph T. Gilbert has hereunto set his hand and seal this twenty-third day of June, A. D. 1897 and the said Nowell Gold Mining Company by its president and by authority of the Board of Directors of said Company has set the seal of its President this 17th day of June, A. D. 1897.

JOSEPH T. GILBERT.

NOWELL GOLD MINING COMPANY.

By THOMAS S. NOWELL,

Its Pres.

In presence of:

J. J. MALONY.

JOHN R. WINN.

M. H. LATIMER.

E. F. CASSEL.

The above agreement is endorsed as follows:

District of Alaska,  
Juneau,—ss.

The within instrument was filed for record at 2:30 o'clock P. M. June 27th, 1899, and duly recorded in Book 15 Deeds, etc., [58] on page 472 of the records of this district.

(Sgn) NORMAN E. MALCOLM,  
District Recorder.

For a full and accurate description of the property conveyed by the said party of the first part to the said party of the second part, the above agreement made between Joseph T. Gilbert and the Nowell Gold Mining Company is here quoted for the purpose of fully describing the property conveyed in this agreement made between the party of the first part and the party of the second part.

IN WITNESS WHEREOF, the party of the first part has hereunto set his hand and seal this 3rd day of December, 1910.

JOSEPH T. GILBERT.

Signed, sealed and delivered in presence of  
F. H. DONALDSON.

Now therefore pursuant to the agreement of the parties hereto of October 31, 1910, and the election of the party of the first part to take the electric current provided for in the agreement of October 14, 1909, formal conveyance of the said property has been made by the Oxford Mining Company to the parties of the second part;

NOW, THEREFORE, in consideration of the premises, it is hereby agreed that if the parties of the second part hereto are deprived at any time by



Alaska Perseverance Mining Company Joseph T. Gilbert his or their successors or assigns, of any of the water now appropriated and used by the second parties out of Sheep Creek at their power plant, then the party of the first part shall only be entitled to the three hundred (300) horse power of electric current provided in the agreement dated October 14th, 1909, decreased by the number of horse power that could be generated by the second parties at their plant with the water of which the second parties at their plant, with the water of which the second parties may have been deprived by Alaska Perseverance Mining Company, Joseph T. Gilbert, his or their successors or assigns.

IN WITNESS WHEREOF, the party of the first part has hereunto set its hand and seal the day and year first above written.

OXFORD MINING COMPANY.

By WALLACE HACKETT,

President.

HENRY ENDICOTT,

Treasurer.

Signed, sealed and delivered in the presence of

LEWIS P. SHACKLEFORD.

L. W. LATTEMORE.

In connection with the above contract the defendants aver that the rights, if any exist, of the above named Joseph T. Gilbert and his assigns under the above referred to contract of June 17, 1897, made with the Nowell Gold Mining Company, have never been adjudicated, determined or agreed upon. [59]

IV.

That under and pursuant to the agreements, contracts and arrangements above set forth, the defendant corporations did construct at Sheep Creek an electric power plant with an electric capacity of approximately 3,000 horse-power, which said power plant was by them completed within the time agreed upon and in the manner agreed upon in full compliance with the contracts and agreements above set forth.

V.

That from and after the date of the completion of said power plant as above stated the defendant corporations were at all times ready and willing to deliver to the said Oxford Mining Company or its successors the 300 electric horse-power referred to in the contracts and agreements above set forth.

VI.

That at or about the time referred to in the complaint a demand was made upon the defendant corporations to furnish the 300 electric horse-power as contracted for to the plaintiff corporation at which time notice was also given the defendant companies that the rights of the Oxford Mining Company in that behalf had been assigned to the plaintiff company; that immediately upon demand having been made in that behalf steps were taken to connect the transmission line of the plaintiff company with the power plant of the defendant companies in such a manner as to deliver to the plaintiff company the 300 electric horse-power referred to in the contract, and from and after that date an electric current of suffi-

cient volume and voltage to produce 300 electric horse-power was by the defendant companies furnished to and placed at the disposal of the plaintiff corporation at the power plant of the defendant companies at Sheep Creek. [60]

#### VII.

That the defendant corporations are the owners and operators of large producing mines situated on Douglas Island, in the Territory of Alaska, that is to say, the said three corporations are the owners and operators of what is usually known as the Treadwell Group of Mines, in connection with which approximately 900 stamps, as well as a cyanide plant are operated. That the power generated at the defendants' Sheep Creek Power Plant above referred to is used by them in connection with the operation of the said mines, stamp-mills and cyanide plant.

#### VIII.

That neither the defendant corporations nor any of them are engaged in the business of selling or disposing of power, and are not now and never have disposed of any power to any person, persons or corporations whatever, except a small quantity of power they are under contract to furnish to the Alaska Juneau Gold Mining Company; that they have not now and at no time hereinafter mentioned had any surplus power whatsoever not used by them in connection with their own operations after furnishing the power that they have long since furnished the Alaska Juneau Gold Mining Company; and that the operations of the defendant corporations require the continuous use of all the power available after so

furnishing the Alaska Juneau Gold Mining Company and the plaintiff respectively with the power to each as above stated.

### IX.

That the defendant corporations have installed at their Sheep Creek power-house a circuit-breaker which automatically breaks the circuit whenever the plaintiff company draws from its bus-bars electric power equivalent to more than 300 horse-power; that the [61] circuit is not broken by said circuit-breaker unless more than 300 horse-power is so drawn; that the circuit-breaker as installed and maintained by the defendant companies is an appliance in common use in connection with the distribution of electric current and is the only appliance that can be installed or maintained by the defendant companies to protect themselves against short circuits occurring along the line of the plaintiff, and against attempts on the part of the plaintiff to draw from the bus-bars of the defendant companies horse-power in excess of 300 electric horse-power, and that unless the defendant companies are so protected against such short circuits and against such attempts to draw from their bus-bars a load in excess of 300 horse-power their plant is apt at any moment when such short circuits or peaks produced by such attempts to overload go in to be shut down, which shut-downs in addition to the damage naturally resulting in ordinary cases would in the case of the cyanide plant more especially result in great and irreparable damage due to the loss of gold-bearing solution in circuit and to the filling up of air lift pits which take from one to three days



to open up and again start in operation, and various other effects naturally resulting to a cyanide plant from a sudden shut down; in addition to the effect of a shut down the defendant companies the effect of short circuits and peaks coming in from the plaintiff's line would be to injure and disable and in many cases to destroy the generator, motors and other appliances and machines of the defendant corporations.

#### X.

That the circuit-breaker so installed and maintained by the defendant companies is so placed and at all times has been so placed as to permit the uninterrupted flow of a current of electricity of sufficient amperage and voltage to furnish [62] the 300 horse-power, and that if the plaintiff was at the times in the complaint mentioned or at any other time unable to utilize the 300 horse-power so made available for its use such inability of the plaintiff to utilize the same was due wholly to the inefficiency of its machines, the incapacity of those operating the same or to some other fault or faults of the plaintiff beyond the control of the defendant companies.

#### XI.

That while the capacity of the generators installed by the defendant companies at their Sheep Creek power plant is approximately 3,000 horse-power the flow of the water in Sheep Creek varies, so that at times there is ample water to propel said generators to their full capacity, while at other times there is no water at all. At the present time there is enough water to generate approximately 500 horse-power, that is to say, 200 horse-power in excess of the 300



horse-power furnished the plaintiff company, and as the season advances the flow of water will diminish, unless unusual weather conditions should prevail, until the spring thaw, and the rain that usually occur in the spring again swell the volume of water in Sheep Creek.

## XII.

That in addition to the power plant at Sheep Creek the defendant companies have a power plant at Nugget Creek, for the generation of electric power, but that during many months in the year the combined power generated at Nugget Creek and Sheep Creek is insufficient to furnish power to propel the machinery of the defendant companies and the defendants are obliged to generate additional electric power by means of steam, and that at the present time they are using steam for that purpose, so that if the plaintiff corporation were to draw peaks from the defendants' general supply of electricity at the present time, the defendant [63] companies would be obliged to generate such excess amount of electric current by means of steam and would be obliged not only to use fuel, the cost of which is very large, but would also be obliged to maintain adequate machinery for that purpose.

## XIII.

That the defendant corporations have at all times since the completion of their said Sheep Creek power plant stood ready and willing to deliver to the Oxford Company and its successors an uninterrupted and continuous flow of electrical current equivalent in amperage and voltage to 300 electric horse-power in

full compliance with the terms of the contracts above set out, and are now ready and willing to deliver the same, the same having been made available for the plaintiff's use in the manner above stated, and further, that the defendant corporations have in all respects complied with the covenants and agreements to be kept and performed by them or on their part in the above described contracts.

#### XIV.

That while the defendant companies were notified by the plaintiff company that it had succeeded to the rights of the Oxford Company to the 300 horse-power referred to in the above named contracts, the defendants are informed and believe and therefore allege the fact to be that the last above mentioned contract, being the agreement under date of April 22, 1911, which said agreement is the agreement by which the rights between the Oxford Company and the defendant companies were finally determined and agreed upon in relation to the 300 horse-power was never assigned to the plaintiff corporation, and that the rights arising thereunder in favor of the Oxford Company are still in said company and not in the plaintiff.

#### XV.

That by reason of the facts set up in the next preceding paragraph the plaintiff is not now and never has been entitled to receive from the defendant corporations, or either or any of [64] them, the 300 electric horse-power above referred to or any part of the same or any power at all.

#### XVI.

That a court of equity has no jurisdiction in the

premises to decree specific performance of the contract or contracts above set forth, or to any or either of them, or otherwise to enforce the provisions of the same or the provisions of any or either of them; that the defendant corporations and each of them are solvent and able to respond in damages to any judgment that might be recovered by the plaintiff against them or either of them for damages resulting from a breach of the above and foregoing contract or contracts, or either or any of them if such breach should occur, and that the plaintiff has a plain, speedy and adequate remedy at law and a court of equity has no jurisdiction to grant the relief prayed for in the complaint or any part thereof, the plaintiff's remedy being at law.

WHEREFORE the defendants, and each of them, pray that the plaintiff's bill of complaint be dismissed; that it take nothing by reason thereof and that the defendants and each of them recover their costs and disbursements in this behalf incurred.

HELLENTHAL & HELLENTHAL,  
Attorneys for Defendants, Alaska Treadwell Gold Mining Company, Alaska United Gold Mining Company, Alaska Mexican Gold Mining Company and Robert A. Kinzie.

United States of America,  
Territory of Alaska.

Robert A. Kinzie, being first duly sworn, on oath deposes and says: That he is the general superintendent of each and all of the above-named companies and corporations; that he has read the foregoing instrument and knows the contents thereof

and knows the same to be true.

ROBT. A. KINZIE.

Subscribed and sworn to before me this 7th day  
of January, A. D. 1913.

SIMON HELLENTHAL,  
Notary Public in and for the Territory of Alaska.  
[65]

[Endorsed]: Original. No. 968-A. In the Dis-  
trict Court for the District of Alaska, Division No.  
1. Alaska Gastineau Mining Company, a Corpora-  
tion, Plaintiff, vs. Alaska Treadwell Gold Mining  
Company et al., Defendant. Answer. Hellenthal  
& Hellenthal, Attorneys for Defendants. Office,  
Juneau, Alaska.

Received a copy of the within Answer this 6th  
of January, 1913.

SHACKLEFORD & BAYLESS,  
Z. R. CHENEY,

Attys. for Ptffs.

Filed Jan. 7, 1913. E. W. Pettit, Clerk. [66]

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*In the District Court for the District of Alaska,  
Division No. 1, at Juneau.*

Case No. 968-A.

ALASKA GASTINEAU MINING COMPANY,  
Plaintiff,

vs.

ALASKA TREADWELL GOLD MINING COM-  
PANY, a Corporation, ALASKA UNITED

GOLD MINING COMPANY, a Corporation,  
ALASKA MEXICAN GOLD MINING COM-  
PANY, a Corporation, and R. A. KINZIE,  
Defendants.

**Reply.**

Referring to the allegations contained in that portion of the defendants' answer on file herein subsequent to paragraph XII, being the affirmative allegations of the said answer, the plaintiff denies each and every allegation therein contained save and except such allegations as correspond with the allegations in the plaintiff's complaint.

SHACKLEFORD & BAYLESS,  
Z. R. CHENEY,

Attorneys for Plaintiff.

United States of America,  
District of Alaska,—ss.

B. L. Thane, being first duly sworn, on oath deposes and says: That he is the General Manager of the plaintiff corporation in the above-entitled action; that he has read the foregoing reply, knows the contents thereof and the same is true as he verily believes.

B. L. THANE.

Subscribed and sworn to before me this 15th day of January, 1913.

W. S. BAYLESS,  
Notary Public for Alaska.

[Endorsed]: Due service of a copy of the within is admitted this 15th day of Jan. 1913. Hellenthal & Hellenthal, Attorneys for Defendants. Filed Jan.



15, 1913. E. W. Pettit, Clerk. Original. No. 968-A. In the District Court for the District of Alaska, Division No. 1 at Juneau. Alaska Gastineau Mining Company, a Corporation, Plaintiff, vs. Alaska Treadwell Gold Mining Company et al., Defendants. Reply. Shackleford & Bayless, Attorneys for Plaintiff. Office, Juneau, Alaska. [67]

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*In the District Court for the Territory of Alaska,  
Division No. 1, at Juneau.*

No. 968-A.

ALASKA GASTINEAU MINING COMPANY, a  
Corporation,

Plaintiff,

vs.

ALASKA TREADWELL GOLD MINING COM-  
PANY, a Corporation, ALASKA UNITED  
GOLD MINING COMPANY, a Corporation,  
ALASKA MEXICAN GOLD MINING COM-  
PANY, a Corporation, and ROBERT A.  
KINZIE,

Defendants.

**Bill of Exceptions.**

BE IT REMEMBERED that on the 7th day of January, 1913, the above-entitled and numbered cause came on regularly for trial before the Honorable PETER D. OVERFIELD, Judge of the District Court for the District of Alaska, Division Number One; that at such hearing the plaintiff appeared by its attorneys, Messrs. Shackleford & Bayless, and

the defendants appeared by their attorneys, Messrs. Hellenthal & Hellenthal, and that thereupon the following proceedings were had:

The plaintiff to maintain the issues on its part produced and called as witnesses the following named persons, to wit: L. P. Shackleford, B. L. Thane, W. S. Pullen, H. L. Wollenberg and H. A. Bishop.

And the defendants to maintain the issues on their part called as witnesses the following named persons, to wit: D. W. Proebstel, E. P. Kennedy, R. A. Kinzie and E. J. Kingsburg.

The witnesses so called by the respective parties, plaintiff and defendants, having been first duly sworn on oath to tell [68] the truth, the whole truth and nothing but the truth, testified on oath respectively as hereinafter set forth: [69]

**[Testimony.]**

**[Testimony of L. P. Shackleford, for Plaintiff.]**

L. P. SHACKLEFORD, being called and duly sworn, testified as follows on behalf of plaintiff.

**Direct Examination.**

Q. (By Mr. BAYLESS.) Just state your name.

A. L. P. Shackleford; attorney at law; Juneau, Alaska.

Q. Mr. Shackleford, prior to the month of August, 1909, were you the attorney for the International Trust Company of Boston?

A. Yes; I represented the International Trust Company since the month of December, 1905.

Q. Well, you had charge on behalf of the Inter-

(Testimony of L. P. Shackelford.)

national Trust Company of the negotiations with the Treadwell Company in this matter?

A. I had been representing them and had physical charge of their property—the property described in the lease of October, 1909.

Q. Well, just state—

A. In the month of May, 1908, I became attorney for the defendant companies in this case and became acquainted with Mr. Bradley and Mr. Taylor.

Q. At that time did the—what property did the International Trust Company own at Sheep Creek?

A. The International Trust Company was in possession and control of the property described in the agreement and lease set forth in the plaintiff's complaint in this case and was also in possession and control of what is known as the Silver Bow Basin placer mine.

Objection.

Q. What water right at Sheep Creek did the International Trust Company own?

A. In possession and control of a water-power plant about the same [70\*—1†] place where this water-power plant is now situated of the defendant companies. It had a head of about 240 feet, as I remember, and a large pipe-line to it and had been actually in mining operation of the Sheep Creek mine.

Q. With railway and tram road and compressor and other buildings and appurtenances to it?

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\*Page-number appearing at foot of page of certified Transcript of Record.

†Original page-number appearing at foot of page of Testimony as same appears in Certified Transcript of Record.

(Testimony of L. P. Shackleford.)

A. There were a number—

Mr. J. HELLENTHAL.—Just a moment. I am inclined to think, your Honor, that all this matter having been merged into the contract is all immaterial anyway. Doesn't make any difference whether they owned this property or what happened to it. The contract is with reference to that property and we are—

COURT.—The Court will probably, before we get through with this case, want to know the situation of the parties at the time they entered into the contract.

Mr. J. HELLENTHAL.—Very well.

Q. (By Mr. BAYLESS.) Well, what negotiations did you have with Mr. Bradley about that time? A. Well, in the early part of August—

Mr. J. HELLENTHAL.—At this point, your Honor, we desire to interpose the objection that whatever negotiations were had—I don't object to Mr. Shackleford's stating that they had negotiations but as to just what the negotiations were between them is wholly incompetent and irrelevant because they were all subsequently merged into a written contract and the written contract is now all that can be before the Court.

COURT.—The same ruling. The Court has already ruled and rules again the same way; that is I presume, as I say it necessary in the hearing of this cause to know the exact situation of the parties at the time they entered into the contract; not to vary the terms of the contract that they are [71—2]

(Testimony of L. P. Shackelford.)

claiming, of course, but to be able to understand the intention of the parties.

Mr. J. HELLENTHAL.—No objection, your Honor, to the testimony so far as it bears on the situation of the parties. The only objection is to the testimony so far as it bears on the actual agreement between the parties because that is merged in the contract.

COURT.—My ruling will go a little further than that, Mr. Hellenthal, to save your record. What the intent was under the contract will probably be facts important for me to understand as any other part of the negotiations or surrounding circumstances at the time the contract was entered into and before I can know.

Mr. J. HELLENTHAL.—May it be understood, your Honor, that all the testimony bearing on that matter goes in under my objection as incompetent, irrelevant and immaterial.

COURT.—Exception will be allowed.

Mr. J. HELLENTHAL.—That the matter is all merged in the written contract, and exception allowed.

COURT.—The record may so show. You may proceed.

A. (By the WITNESS.) In the early part of August, 1909, Mr. Bradley came to my office and stated that they would like to acquire what is known as the lower water right and power plant and mill-sites on Sheep Creek. That plant was in a state where it could be used, but it hadn't been in use for



(Testimony of L. P. Shackelford.)

two or three years, the title to the Sheep Creek mines having been in dispute and after some discussion I informed him that I didn't think he was prepared, from his offers, to pay a price that would be attractive to the owners of the property and he finally outlined an agreement which he called a—I have forgotten the exact term. It is a—

Q. (By Mr. BAYLESS.) Flood water contract?  
[72—3]

A. —flood water agreement, and it was practically in the form that it is now.

Q. (By the COURT.) At what time was that?

A. That was in the month of August, 1909. So within two or three days, some time prior to the 10th of August, his representations at that time was that he was willing to insure to the International Trust Company and the parties interested in that property or in the Sheep Creek mines sufficient power to operate the Sheep Creek mines, and I told him that I thought a contract along that line giving adequate power for the operation of the mine might meet with the approval of the Boston bondholders and of the trust company. He estimated that we would need at least 150 horse-power to operate the mines with; that was not to start the machinery but to operate the mines with, and he said that he thought 200 horse-power would be a liberal estimate for the power continuously required in the operation of the mine. The contract was a draft of our ideas about the matter.

Mr. J. HELLENTHAL.—It is understood the record covers my objections to the questions?

(Testimony of L. P. Shackelford.)

The COURT.—It is so understood. The record will so show.

A. (By the WITNESS.) A draft of our ideas about the matter so far as we had gotten, involving a lease during the period of the construction and an option to take the horse-power and an option in the case we didn't at the end of ten years take the horse-power, was drawn up and various alterations in it were made.

Q. (By the COURT.) Who drew up the option?

A. I drew a skeleton of the option and after that time the option was either drawn or dictated by Mr. Bradley or Mr. Taylor. [73—4] The option probably will be—the original draft is probably in my handwriting very largely, as both the gentlemen suggested alterations and changes I would note them. The option or the contract, I should say, wasn't signed by either of the parties at that time. It was simply a draft for submission in Boston.

Q. Drawn up where originally?

A. Drawn up here in Juneau and at Treadwell—after it was completed, I will say that the last clause in the option defining an uninterrupted current was drawn by me. I originally used the word “continuous” instead of “uninterrupted” and it stood in the contract, I think, until we got on a boat. We went down below together. At that time it was changed to the word “uninterrupted” at Mr. Taylor's suggestion because he said continuous had a meaning in electricity which might require them to deliver a direct—at any rate that word was changed.

(Testimony of L. P. Shackelford.)

However, when the contract was completed, Mr. Bradley wrote a letter to Mr. Henry Endicott, who was the most influential bondholder in the—under the mortgage deed of trust, held by the International Trust Company and who represented most of the other bondholders and I took that letter with me and a draft of the contract. The original of that letter is in Boston. I have a copy, however, which I have examined and which I know to be a correct copy and I will present the letter in connection with my testimony.

Q. (By Mr. J. HELLENTHAL.) Do you wish to offer this, Mr. Shackelford? A. Yes.

Mr. J. HELLENTHAL.—I would suggest, your Honor, that the making of the offer or receiving of this letter be delayed [74—5] until I can inquire into the correctness of the copy. I presume it is a correct copy; don't desire to put Mr. Shackelford to the trouble of getting the original unless it is necessary.

COURT.—May proceed.

A. (By the WITNESS.) Upon my arrival in Boston I presented to them the draft of the contract and the matter was discussed between the three principal bondholders and myself, Mr. Henry Endicott, Mr. William Endicott and Mr. Wallace Hackett,—and they asked me if I considered 200 horse-power adequate and I told them that was a subject upon which I declined to advise them because I had no technical knowledge of the requirements of the plant. I could tell them there was a

(Testimony of L. P. Shackleford.)

thirty-stamp mill there and about the machinery that was there. At that time Mr. Thane was in Boston and they took the matter up with him and asked him.

Mr. J. HELLENTHAL.—This, your Honor, is quite a long ways from any agreement. That was had between the Endicotts and officers of the people themselves.

COURT.—Yes; I think it is. I agree with you.

Mr. J. HELLENTHAL.—If the matter is only a matter relating to things that lead up to something, why of course it is all right.

COURT.—Of course, statements between yourselves with the International Trust Company that the defendants had no notice of, no knowledge and no one present, of course wouldn't in any way be binding until I see how it might assist the Court in this case. Any knowledge on the part of one contractor that wasn't conveyed in any shape or manner to the other wouldn't be.

Mr. BAYLESS.—If the Court please, all this leads up to the addition of 300 horse-power in place of the 200 horse-power as the contract was subsequently drawn.

COURT.—If that was, of course, made known to the other parties—the Treadwell Company—then it would be all [75—6] right. No objection to it.

Q. (By Mr. BAYLESS.) I will ask you, Mr. Shackleford, if the conversation in Boston and negotiations there—you had with the Endicotts and Wallace Hackett was afterwards made known to the

(Testimony of L. P. Shackelford.)

Treadwell company?

A. I don't think the details of them were. The result of Mr. Thane's advice was made known to Bradley.

Q. (By the COURT.) Made known to Treadwell? A. To Mr. Bradley.

COURT.—Well, it is difficult for me to rule on such kind of statement.

Mr. J. HELLENTHAL.—Let it go in under my objections and exception.

COURT.—Very well.

Mr. J. HELLENTHAL.—With the understanding, we may latter move to strike it.

COURT.—Very well.

A. (By the WITNESS.) All I may say on the subject is simply this, that after consulting with Mr. Thane he advised them that they would require 300 horse-power in continuous use to operate that mine. Thereupon Mr. Henry Endicott sent a wire to Mr. Bradley at Wardner, Idaho, a copy of which I present for identification and ask to be offered.

Q. (By the COURT.) You were present at the time that Thane discussed this matter with Endicott and Hackett? A. Yes, sir.

COURT.—Just read that last part of it.

Mr. J. HELLENTHAL.—That is a copy of the original, you say?

A. Yes, that is a copy of the telegram.

Mr. J. HELLENTHAL.—Let that also be held, your Honor, until [76—7] it can be compared. I think it is probably all right.



Mr. BAYLESS.—We ask to have them identified, both these papers.

COURT.—May be marked for identification.

**[Plaintiff's Exhibit No. 1 for Identification.]**

“A. G. Co. v. Al. T. Co., et al., Plff's. Ex. 1 for Ident. R. E. R. Rec'd. R. E. R.

(Copy)

Treadwell, Alaska, August 10, 1909.

Henry Endicott, Esq.,  
101 Tremont Street,  
Boston, Mass.

Dear Sir:

We have been talking to Mr. L. P. Shackleford about your water right on sheep creek this district and both he and ourselves have agreed upon what we consider an extremely fair proposition our concession have been drawn up in the shape of a document which Mr. Shackleford will present to you as it is now this sheep creek water power is in jeopardy and can be taken at any time by adverse interests our proposed arrangement will preserve your rights while at the same time developing them and making the most use of them. I presume you are holding this water right for the value that it has had and may have in the future for working the sheep creek mines and thirty stamp mill connected therewith estimating conservatively 150 HP. is all the power these mines and mills ever required for their past operations. The mill is amply large enough for the mine and surely two hundred H.P. will more than take care of future requirements if the proposition is at all acceptable to you we would begin immediate

(Testimony of L. P. Shackleford:)

work thereby preserving your rights and returning you some monthly income the proposition provides amply time in which you could decide [77—8] either to sell the property outright or take two hundred H. P. for the operation of the mines and mill, your very truly,

F. W. BRADLEY.”

**[Plaintiff’s Exhibit No. 2 for Identification.]**

“A. G. Co. v. A. T. Co., et al. Plff’s Ex. 2 for Ident. R. E. R. Recd. R. E. R.

(Copy)

Boston, August 23, 1909.

F. W. Bradley,

Wardner, Idaho.

Will lease power on terms proposed subject to consent trust company if three hundred horse power is substituted for two hundred.

HENRY ENDICOTT.”

COURT.—Go ahead.

A. (By the WITNESS.) Two or three days afterwards—the exact date I haven’t and the exact date of Mr. Bradley’s telegram I haven’t but I have a copy of—of both of the telegrams—Mr. Endicott received the following telegram from Mr. Bradley.

Mr. J. HELLENTHAL.—Let that be held in the same way, your Honor. I think probably that is a copy of the telegram.

COURT.—It may be marked for identification Plaintiff’s Exhibit 3.

(Testimony of L. P. Shackelford.)

**[Plaintiff's Exhibit No. 3 for Identification.]**

“A. G. Co. vs. A. T. Co. et al. Plff's Ex. 3 for Ident. R. E. R. Recd. R. E. R.

(Copy)

Henry Endicott:

You may substitute three hundred for two hundred horse power may I cable Sup't Kinzie to begin immediate protection measure.

F. W. BRADLEY.” [78—9]

A. (By the WITNESS.) Thereupon there was no—there was nothing done for several days until Mr. Bradley's wire was received. Shortly after that Mr. Hackett and I proceeded with the organization of the Oxford Mining Company and the property theretofore held in trust by the International Trust Company was deeded to the Oxford Mining Company as soon as the president of the Trust Company returned from Europe and as soon as this was done the contract, as drafted or submitted by Mr. Bradley with his letter in August, was signed exactly as drafted and submitted except wherever the words two hundred horse-power had appeared in the contract originally the words three hundred horse-power were substituted.

Q. (By Mr. BAYLESS.) During all these negotiations was anything said by either of the parties with reference to a starting surge?

A. No; nothing was said at all. I had no knowledge whatever of the necessity of a starting surge. I didn't suggest it; didn't discuss it. The estimates that were made of the amount of power that we would

(Testimony of L. P. Shackleford.)

require by Mr. Bradley at the time the contract was drawn was based on the actual need of the mine and not upon any starting surge, as discussed here, and it wasn't until after October, 1910—after we had elected to take the current that any statement was made to me or anybody with my knowledge concerning the fact that the starting surge was necessary or that the contract meant anything else in practical and effectual terms than three hundred horse-power.

Q. Nothing was said about a peak load?

A. Nothing was said about a peak load by any of the parties until after we had elected to take the current. [79—10]

Q. And Mr. Bradley and Mr. Taylor practically drafted the contract as afterwards signed?

A. It was drafted as their proposition. They didn't sign it—they drafted it and then enclosed it in this letter from Mr. Bradley which has been presented. As soon as the Oxford Company signed the contract it was sent to San Francisco and signed there.

Q. And the only change that the Oxford Company put into Mr. Bradley's contract was three hundred horse-power where Mr. Bradley had two hundred?

A. That is it.

Q. And it was the representations of Mr. Bradley upon which the Oxford Company, Wallace Hackett and the Endicotts relied?

A. Yes, this correspondence was presented to them and from the discussions had at the time I know that they assumed that they would have an effectual

(Testimony of L. P. Shackleford.)

power at their disposal of the amount named in the contract.

Mr. J. HELLENTHAL,—Your Honor, I think that is going pretty far—what it indicates and I think that is pretty far.

COURT.—Well, I presume it is a conclusion that we might say an attorney might draw for a company. It may stand for what it is worth.

Mr. BAYLESS.—I think that is all.

#### Cross-examination.

Q. (By Mr. J. HELLENTHAL.) When were these negotiations made, Mr. Shackleford?

A. In the early part of August.

Q. That is the year 1909? A. 1909.

Q. 1909. Yes. [80—11]

A. Mr. Bradley had negotiated once or twice before that time with other parties, I think, about purchasing power from Sheep Creek but the negotiations had never come to anything before this time. This was the first negotiation he had at—the year before he had said to me: “I would like to have the plant,” and then the matter was dropped without any further discussion.

Q. The discussion that Mr. Bradley had with you at the time was rather of an informal nature, was it not, Mr. Shackleford? You were representing Mr. Bradley as attorney and also the International Trust Company and had informal conversations with him before anything was done—that was in August?

A. Why, the talk wasn't informal. The first day he came over there and discussed the matter in-



(Testimony of L. P. Shackleford.)

formally. After that when we got down to drawing the contract and the requirements—the amount of power, the talk wasn't informal.

Q. The International Trust Company had a small generator on one of these millsites at that time, as I understand it?

A. I don't know the size of the generator, Mr. Hellenthal. I know it operated a compressor plant of considerable size and I know the mine had been operated, at least partially operated from that power plant—they had had two power plants. One had taken advantage of the upper falls, but it had been in disuse a number of years.

Q. It was the lower falls with which they were contracting?

A. Yes; the lower waterpower which was the subject of the contract.

Q. And the lower power plant was the one to which you referred to?

A. The lower power plant is the one described in the contract of October, 1909.

Q. That was situated approximately where the Treadwell Company's [81—12] new power plant is now situated? A. Yes; that is it.

Q. The first contract executed—after the first negotiations that were had between yourself, Mr. Bradley and the Boston parties the lease or contract of October 14th was executed, was it not, Mr. Shackleford?

A. Yes, sir; that was the first contract—October 14, 1909.

(Testimony of L. P. Shackelford.)

Q. That is the contract set up in the answer here?

A. Yes, sir.

Q. As the first contract executed?

A. That is right.

Q. After that the power plant was constructed. You turned the possession of all the property described in this lease over to the Treadwell Company as the agent?

A. They took possession of it in the month of September or August—I have forgotten—before the contract was actually executed, but upon advice that was agreeable to the owners.

Q. They took possession of the power plant and the millsites and other properties described in this lease and went at the construction of their plant?

A. Started in the construction of their plant.

Q. The plant was constructed that fall, was it. Mr. Shackelford?

A. No; the plant was constructed during the ensuing year.

Q. In part that fall and in part the next year?

A. Yes, sir.

Q. After the plant had been constructed your people elected to take the twenty-five—or the 300 horse-power provided in the lease in lieu of the twenty-five thousand dollars at a later date and then the final contract and agreement, including the deed to the property was executed? Is that true?

A. No; that is not exactly right.

Q. Well, how is that? [82—13]

A. The original contract of 1909 required that we

(Testimony of L. P. Shackelford.)

should exercise our option to take the power, if we exercised such an option, at the end of two years—

Q. Yes.

A. —but at the end of the first year the plant had been completed.

Q. Yes.

A. The time the contract was drawn, we didn't expect the plant to be completed that soon—so as soon as it was completed I was in San Francisco and an inquiry was made of me about whether we were going to take the power or not, and I gave them notice of election sometime in October, 1910.

Q. (By the COURT.) By "them," who do you mean?

A. They—the defendant companies in this case; the Treadwell and the Mexican and the United—notice of election—

Q. (By Mr. J. HELLENTHAL.) Yes.

A. —to take the power. The second instrument which you call a contract there is a deed. We simply deeded under the provisions of the contract of 1909.

Q. That second instrument—was it executed?

A. Yes, sir.

Q. That is the second instrument set up in the answer?

A. Yes. I think that instrument was executed the next spring but the election had been given—

Q. Executed whenever it is dated?

A. —in the fall.

Q. But at the time it is dated?

A. Yes, sir; about that time.

(Testimony of L. P. Shackelford.)

Q. Then after that, Mr. Shackelford, your attention and the attention of the defendant companies was directed to what was called [83—14] and generally referred to as the Gilbert contract? Do you recall that?

A. I returned here after having given notice of election to take the power—

Q. Yes.

A. —returned here in December; I think it was in 1910 and sometime in January my attention was called to an instrument which had been recorded up here called the Gilbert contract which was at that time some ten or twelve years old—

Q. Yes.

A. —and considerable discussion about it, and when I was in San Francisco in February, after corresponding with the members of the Oxford Company, I stated that the Oxford Company had no desire to claim under their present contract in the case Gilbert should ever establish his right to the water; that is, didn't want to claim any diminution that had been given in Gilbert's favor and against the defendant companies in this case, and, as a result of that, later in the year—I have forgotten the exact date—a contract in the form or with the intention rather of an indemnity contract was executed between the parties.

Q. That is the contract set up in the answer—the third contract set up in the answer?

A. Yes; that is the third contract.

Q. Under date—the 22d of April, 1911?

(Testimony of L. P. Shackelford.)

A. I don't remember the day,—

Q. About the date?

A. —but that is the third contract which you set up in your answer.

Q. That contract was then executed between the parties? [84—15]

A. Yes, sir.

Mr. J. HELLENTHAL.—That will be all, Mr. Shackelford.

Witness excused. [85—16]

[Testimony of B. L. Thane, for Plaintiff.]

B. L. THANE, being called and duly sworn, testified as follows on behalf of the plaintiff.

Direct Examination.

Q. (By Mr. SHACKLEFORD.) Mr. Thane, state your name, residence and occupation to the Reporter.

A. B. L. Thane; Juneau, Alaska; mining engineer; manager of the Alaska Gastineau Mining Company.

Q. You are the manager of the plaintiff corporation in this case? A. I am.

Q. I will ask you, Mr. Thane, if you were present in Boston in the summer or early fall of 1909?

A. I was.

Q. Do you recollect an incident of my presenting certain correspondence and a draft of an agreement for water-power at Sheep Creek at the office of Mr. Henry Endicott, 101 Vermont street? A. I do.

Q. I will ask you if your advice on the requirements in the way of horse-power was requested at that time with reference to the amount of horse-power that would be necessary to the operation at



(Testimony of B. L. Thane.)

Sheep Creek? A. It was.

Q. You were more or less familiar with the general equipment at Sheep Creek? A. I was.

Q. I will ask you if you advised them as to the amount of horse-power that would probably be required there for the operation of the mine. [86—17] A. I did.

Q. What amount does it—?

Mr. J. HELLENTHAL.—Now, we object to that, your Honor.

COURT.—That goes in under the same ruling the Court has made heretofore, with an exception.

Mr. J. HELLENTHAL.—Object, incompetent, irrelevant and immaterial.

A. (By the WITNESS.) May I answer the question?

COURT.—Answer the question.

A. I advised them 300 horse-power.

Q. (By Mr. SHACKLEFORD.) Was that advice based on any estimate whatever as to the necessity of starting surges? A. It was not.

Mr. J. HELLENTHAL.—Do I understand, your Honor, that Mr. Thane's answer to the last question is also subject to the same objection?

COURT.—Yes, all of this, Mr. Hellenthal.

Mr. J. HELLENTHAL.—All right.

COURT.—By all this, I mean all this class of testimony which you have already objected to and taken an exception to.

Mr. J. HELLENTHAL.—Yes, sir.

Q. (By Mr. SHACKLEFORD.) Mr. Thane,

(Testimony of B. L. Thane.)

what time did the plaintiff company in this case take possession of the property of the Oxford Company—during about what time? A. Sometime in May.

Mr. J. HELLENTHAL.—I think that is immaterial.

A. (By the WITNESS.) May of this year.

Q. (By Mr. SHACKLEFORD.) I will ask you if you notified the defendant corporations early in the summer that you expected to use this power in winter operation? [87—18] A. I did.

Q. How soon was that, approximately—the first notice?

A. I think it was during the month of September.

Q. (By the COURT.) I don't understand—what year? A. September or October.

Q. (By Mr. SHACKLEFORD.) What year is this? A. Last year—1912.

Q. 1912? A. Yes.

COURT.—Do I understand from the attorney's remarks that there is no contention about the plaintiff company's being the successor in interest of the International and the Oxford?

Mr. J. HELLENTHAL.—No, your Honor, that is not the correct conclusion.

COURT.—You said it was immaterial. I didn't catch what you meant, unless you would mean that.

Mr. J. HELLENTHAL.—That may become material hereafter as to whether the plaintiff has succeeded to the rights. Mr. Thane's testimony only goes to the fact of having taken possession of some of

(Testimony of B. L. Thane.)

the Oxford properties and doesn't go to the extent of that.

Q. (By Mr. SHACKLEFORD.) As early as July of this year, Mr. Thane, you commenced preparations for construction of lines with which to take this power from the Sheep Creek plant? A. We did.

Q. (By the COURT.) That is you mean July of last year?

Q. (By Mr. SHACKLEFORD.) July of last year, 1912. I will ask you, Mr. Thane, to describe in a general way what was done with reference to making connections and your plans for the use of this power during the ensuing time? [88—19]

Mr. J. HELLENTHAL.—Now, your Honor, I think that is quite immaterial, except to use it, that is all.

COURT.—I didn't catch the last part of your statement.

Mr. J. HELLENTHAL.—If he states they got ready to use it that is as far as he should go into the matter, as it don't bear on anything—immaterial—merely encumbers the record I think, and not necessary.

COURT.—I don't on the surface see the materiality.

Mr. SHACKLEFORD.—Well, if your Honor please, we have a complaint here which alleges the situation of the parties in considerable detail with reference—with what power to connect and the proposed work of this company and if we didn't connect the power up and start in to work and rely on it and

(Testimony of B. L. Thane.)

had a program at work, and introduced such evidence as that we will find at the end of this case Mr. Hellenthal will again insist on his demurrer on the ground that we are entitled to legal and not equitable relief.

COURT.—The point is well taken. May proceed.

A. (By the WITNESS.) The point is just this: after the consolidation was executed in New York and all the stock and bonds had been exchanged I was given orders by the people who had advanced the money and placed it in the treasury to start the work and in the meantime Mr. E. C. Jacklin and Mr. Albert Holden, two very well known mining engineers, arranged to come out in July to form a basis of the size of the equipment that we would put in,—be necessary to make the proposition pay and put it in shape. They arrived in July.

Mr. J. HELLENTHAL.—Mr. Thane, just a moment. If it please the Court, let it be understood that the testimony bearing on [89—20] this matter goes in under our objection as incompetent, irrelevant and immaterial; that the rights of the parties have to be determined by the contract itself.

COURT.—Objection overruled and exception allowed, which will go to this class of testimony as introduced in this case.

Mr. J. HELLENTHAL.—Yes, your Honor.

COURT.—Not only by this witness but any witnesses that may follow which will save you making objections and the Court ruling.

A. (By the WITNESS.) They arrived about the 4th or 5th of July and looked over the whole proposi-



(Testimony of B. L. Thane.)

tion and decided that it would require at least a 6,000 ton plant in order to make the proposition a payable one and to pay interest on the bonds and on the money necessary to put it in such shape. There was some three and a half million dollars of bonds of the old company outstanding, six per cent bonds, and after a great deal of discussion and a a great deal of engineering work, which had been prepared during the last two years, I was given orders by these gentlemen to push this work as hard as it could be done because every day meant money. Well, I got our organization together as rapidly as possible and started the work all along the line. One of the first efforts was to get connected with the Sheep Creek plant so I could make use of the 300 horse-power as soon as the water got short in Silver Bow Basin and likewise throughout the whole proposition have been working night and day to push it forward and I think it was in September I got into touch with Mr. Kinzie by letter or telephone regarding the use of this 300 horse-power and after considerable correspondence on the subject why they [90—21] finally let us use it and we started in to use it in Silver Bow Basin and also at Sheep Creek and used it up to the time of the fire, and after the fire we used it to Christmas, and after Christmas I was unable to start and everything was shut down in the mine, and I assure you we have made every effort possible there to carry on the line of development work which has been laid out. As a matter of fact all of our work has been laid to schedule—a time schedule—the de-



(Testimony of B. L. Thane.)

velopment of the mine must be done at a certain point—a certain period to try to be ready for the mill and we are working on that basis up there and have maintained and gotten together a crew for that purpose. We have started a great many different openings in the mine, raises, stopes and driving, and organized a crew and they were all working on a bonus in order to push it and the same thing is true at Sheep Creek and all along the line. We are supposed to have all this work done some time after January, 1914, but probably January 1, 1915, I should have said, and we are working as hard as we can to bring that about.

Q. (By Mr. SHACKLEFORD.) Now, Mr. Thane, just describe to the Court what you are opening up at present and how a delay in the power necessary in the opening up of your present workings will effect the final date of the starting of the mine and the effect of getting certain other work done that is under way.

A. Our Silver Bow Basin—we have already had a cross-cut in there, called the Alexander cross-cut, that is approximately 700 feet higher than the Sheep Creek level which will be the main artery through which the ore will go to the mill when they are built at Sheep Creek. Formerly the mines at the [91—22] Perseverance were worked by stopes which were opened up directly over the Alexander cross-cut through means of drifts which were driven east and west on the lode system. This cannot be continued on a large scale because the mine would be opened up

(Testimony of B. L. Thane.)

in the heart of the ore body and endanger it. As a result and in order to supply a large equipment we found it necessary from an ordinary mining standpoint to open up the mine from an entirely different view and that was from the top down. In order to do this we have to drive certain ore-vein-ways—ore-ways, raises, and the Alexander cross-cut up to the surface and expect to open a level 200 feet from the surface which will be our main working level which will be 4,500 feet long. Now, we have to connect that clear through to the Sheep Creek level, a distance of 2,300 feet by means of these two ore-ways, or in the familiar speech, vertical shafts to transport supplies and men. We are now in process of getting these main arteries up to the main working level above, so we can drift off this coming summer, by next year, and put in the chute-ways and open up the stopes necessary to deliver a tonnage of 6,000 tons per day. That is the present line of work.

Q. How many men have you got employed at the Perseverance mine on this development work?

A. Well, we have all that the boarding-house will hold at the present which runs from 175 to 225 daily.

Q. Approximately what is your daily expense there in pay-roll? A. About \$750.00.

Q. (By the COURT.) When you say Silver Bow Basin, do you mean the Perseverance mine—it is used interchangeably? [92—23]

A. Yes, the Perseverance mine is part of the consolidation which is up in Silver Bow Basin, extends clear through to Sheep Creek. The main artery

(Testimony of B. L. Thane.)

from Sheep Creek is going through to connect with the Perseverance on the main lode that is being driven at the present time and the plans of it we have for the mill are being made right now by men in the office—and clearing the foundation for it.

Q. (By Mr. SHACKLEFORD.) A delay at this time in that development work, Mr. Thane, what effect would it have in meeting the other work that is outlined and being carried on?

A. Well, it is a very serious thing. If we are unable to get these raises through this year we can't take advantage of the flow of waters which we have in Silver Bow Basin this coming summer; keep on the full capacity of our compressor plant, in opening up the stopes in the time left—we have got to get those raises through before the water begins to flow if any way to do it; otherwise won't get the mine opened up in time.

Q. Now, with reference to the labor situation: is there any difficulty occurred if you were to discharge a crew of men like this and get it together again? Just state that to the Court.

A. There is at least considerable difficulty attached in obtaining good shaft men and good raise men—plenty of ordinary miners that come and go, but a hard thing to get men who are capable of pushing shaft work and raise work, and we have gone as far as to send to Michigan in order to bring out some capable men for that purpose. Crews have been organized in the different shafts and raises which we are now driving. [93—24]

(Testimony of B. L. Thane.)

Q. What is the amount of bonds, Mr. Thane, now outstanding?

A. About three million and a half par value of Alaska Gastineau bonds outstanding.

Q. What is the rate of interest?

A. Six per cent.

Q. Any delay in reaching the productive stage of this mine would simply accumulate the interest on these bonds?

A. It does, besides that there is—you see the Alaska Gastineau Mining Company—the majority of bonds and shares are held by the—by what is known as the Alaska Gold Mines Company, being a holding company, and besides this three and a half million of bonds which is outstanding there has also already been issued a very large sum to the treasurer of the Alaska Gastineau Company and also a very large sum to the treasurer of the Alaska Gold Mines holding company to be used later in the purchase of this very large equipment and the expenditure of four millions and a half and the bigger part of it is already—

Q. I understand you that prior to the 8th of November the defendants in this case were notified of the assignment of the contract in question to the Gastineau Company?

A. To who—the plaintiff?

Q. The defendants were notified of the assignment of this contract?      A. Yes.

Q. Between the Oxford and themselves, to the Gastineau Company?      A. Yes.



(Testimony of B. L. Thane.)

Mr. J. HELLENTHAL.—That is not the best evidence, your Honor.

Q. (By Mr. SHACKLEFORD.) Well, I will ask you if you had any conference with their attorneys with reference to the matter. A. I did.

Q. What did that finally result in with reference to getting [94—25] the power?

A. They gave it to us.

Q. Now, what use did you put that power to when it was first given to you—did you have any difficulty in starting? A. No.

Q. How was that power used from that time until the time of the Silver Bow Basin fire, just in a general way?

A. Why, at first they gave us enough power to run both the Perseverance and the Sheep Creek plant; later on they must have changed their circuit-breaker and the amount of amperage which they were allowing us, so we were only able to run the Perseverance by itself.

Q. Just tell the Court what you have installed in the Perseverance mine upon which this current is being used?

A. We have a compressor, Ingersoll-Rand compressor of modern type, capable of compressing air to the amount of 325 cubic foot a minute with a—I think that is the exact amount—requires about 165 horse-power to run; we have a 200 horse-power type K motor to drive this compressor with.

Q. What make of motor is K? A. What make?

Q. Yes.



(Testimony of B. L. Thane.)

A. It is a General Electric type K, standard squirrel caged type motor.

Q. Now, I wish you would explain to the Court what the situation is with reference to the general use of K motors in mining operations at this time and at the time the contract was executed in 1909.

A. A K motor is a standard motor used generally all over the world; in fact a type of motor it is particularly built to hold any outside resistance and nobody can fool with it, [95—26] nobody can hurt it; anybody can work around it; and it will stand all sorts of rough usage and dust and dirt and run right along, and I believe it is, ordinarily speaking, it is the motor which is in most use.

Q. What else is that current at the Perseverance—what else is that applied to beside the running of this motor?

A. Well, there are a few lights, that is all.

Q. Mr. Thane, I will ask you about the use of—about the common, ordinary usage, accepted usage, with reference to the measurement of horse-power where power is called for in a contract.

Mr. J. HELLENTHAL.—Now, just a moment, your Honor, that is not a matter for expert testimony or any testimony; that is a question for the Court and in any event if that is a matter for testimony at all it is a matter for expert testimony and Mr. Thane hasn't been qualified to speak on that subject.

COURT.—The latter objection may be taken.

Q. (By Mr. SHACKLEFORD.) I will ask you,

(Testimony of B. L. Thane.)

Mr. Thane, what your experience is in the use of electrical machinery and what experience you have had in the investigation of these subjects with reference to qualifying you as a witness?

A. Well, I haven't been especially trained in electricity, that is. I haven't made a specialty of it. I have come in contact however with electrical equipment and general electrical information, not alone in my college training—university training as a mining engineer, but through the past twelve years in active service in the mining business, and I think I have what any—what knowledge any man would have under the same circumstances. There is nothing about the subject but what anybody can understand. You may have a specialist— [96—27] as a mining engineer you are constantly confronted with all sorts of problems connected with the subject even though you may have a specialist to do the detail work.

COURT.—The objection is now overruled. You may proceed.

Mr. J. HELLENTHAL.—Your Honor, I wish to renew my objection on the ground that the matter inquired about is not a subject of testimony at all, but is a matter for the Court.

COURT.—The objection will be overruled and exception allowed.

G. (By Mr. SHACKLEFORD.) Go ahead, Mr. Thane, and state what the ordinary usage is with reference to the measurement of horse-power per current called for in denomination of horse-power.

A. It is always measured by wattmeter; can't be

(Testimony of B. L. Thane.)

measured by anything else.

Q. I will ask you, Mr. Thane, if you know what the ordinary type of circuit-breaker is that is used where power is sent out from a power-house?

A. The ordinary type is what is known as a time relay circuit-breaker.

Q. What is that usually set at, Mr. Thane? Just explain to the Court the meaning of that.

A. Well, the time relay circuit-breaker is a circuit-breaker which is set so that it will carry—so set carrying a certain number of amperes of current so that it will carry an overload of that current for a given time, say thirty seconds, between twenty and thirty seconds is generally allowed—in some instances more and in some instances less. After this time why the circuit-breaker will go out.

Mr. J. HELLENTHAL.—May it be understood, your Honor, that [97—28] all of the testimony bearing on the matters now in this connection, goes in over my objection incompetent, irrelevant, and immaterial, and my further construction of this contract—must be governed by its own terms by the Court and not by customary matters of usage.

COURT.—The objection is overruled and exception allowed, and it will be also further understood that an objection will be allowed—or an exception will be allowed to all this class of testimony that may be received by the Court in this case.

Q. (By Mr. SHACKLEFORD.) Now, Mr. Thane, I wish you would explain to the Court the result of the conditions in the present case if a time

(Testimony of B. L. Thane.)

relay circuit-breaker were used upon the connection of the plaintiff's power line with the defendants' power-house?

A. Time relay circuit-breaker was installed upon their trunk line at the Treadwell or Sheep Creek power-house never have any difficulty in starting and if there was a wattmeter on their board they would never have any difficulty in cutting us off if we drew over 300 horse-power; never have to bother them in any kind of way and run right along and never draw over 300 horse-power except in the starting surge for an instant.

Q. About how long does this starting surge last?

A. Just for an instant. The sudden rush of the current is almost instantaneous measured by their own ammeters and wattmeters and it slows down within a very few seconds, down to normal amperage.

Q. Now, Mr. Thane, disregarding for a moment the difficulties that are connected with the delivery of an uninterrupted current of 300 horse-power, that is: the technical difficulties [98—29] of that delivery where it is connected with a larger plant, supposing the defendant companies in this case should deliver to the plaintiff an actual uninterrupted current of 300 horse-power, what would the result be with reference to our ability to operate the machinery on the power lines at the Perseverance or any other point of your line?

A. You mean a 300 horse-power load?

Q. Yes, sir.



(Testimony of B. L. Thane.)

A. Be able to start and operate.

Q. Under the conditions set by the defendants companies in their delivery of the power in this case, that is so far as an instantaneous circuit-breaker set at 56 amperes, is it possible to secure the actual use of 300 horse-power?     A. No, sir; it is not.

Q. When did you have your first difficulty in starting the machinery at the Perseverance mine under the circumstance of delivery?

A. The morning after Christmas.

Q. When did you close down before that?

A. When did we close down?

Q. Yes, sir.

A. We closed down the morning of Christmas day.

Q. That closing down was voluntary, as I understand?     A. Yes; voluntary.

Q. It wasn't due to any surge of current?

A. No.

Q. Now, from the time the Perseverance mine started in the early part of December until the closing down on the morning of Christmas day, what have you to say with reference to the consumption of power by the—from the lines or from the powerhouse of the defendant companies? [99—30]

A. We, at first, before the fire—

Q. (By the COURT.) The time of the fire hasn't been fixed.

Q. (By Mr. SHACKLEFORD.) What time?

A. The fire was on the 4th, I believe, of December.

Q. (By the COURT.) Of December?

A. Yes; 4th of December; I think it was the morn-



(Testimony of B. L. Thane.)

ing of the 4th about one o'clock if I recollect right.

Q. (By Mr. SHACKLEFORD.) Well, after the fire you started up?

A. After the fire we started up and we were using about 225 horse-power, I think.

Q. That is it approximately; that is the consumption? A. Yes.

Q. That is what this power line was put to?

A. Yes; that is what we were using.

Q. Now, I wish you would explain to the Court the method which the defendant companies have adopted in this case of penalizing or whatever you might call it—the method which has been adopted of storing current under your contract to deliver you an uninterrupted current.

A. Why, I took the matter up with Mr. Kinzie as soon as we found we were unable to start. The day after Christmas we tried it and kicked out the switch. I didn't care to inform him about it all the time and informed their power-house down there and wanted to know why we couldn't start, and I asked Mr. Kingsbury, I think, their power-house man, if they couldn't let us hold in their switch and let us start and he said no; he had orders from Mr. Kinzie that couldn't be done, and I called up Mr. Kinzie and asked him about it and he said yes; they were not going to allow us a starting surge, and at the same time I asked him over the 'phone if [100—31] he was going to keep this 56 amperes based on unity power factor, and he said he was. Then I told him we were going to try it, if possible, by means of a

(Testimony of B. L. Thane.)

flying-switch, start up with our gas engine, which was unable to pack the load continuously and then take the Treadwell line. We tried it several times and then he suggested that we might synchronize with them, which is rather an unusual thing with a gas engine, and we were unable to do it, and later on, by the way when I called him up to get the switch in again he spoke of this. I told him we were getting ready to synchronize with the gas engine or at least try to and he warned me what the effect would be over there if anything should happen—what the damages would amount to.

Q. (By the COURT.) “Over there” you mean where?

A. Over to the Treadwell line, that is anything happening by our trying to synchronize with them. We didn't think with a gas engine they would even let us try it. Very difficult thing to do anyway, particularly with a gas engine of that type. And I also asked him if he was going to insist on us notifying their head office over at Treadwell every time this switch was kicked out and he said he was, and it was after that I asked you to have an interpretation of the contract made. Of course, you can see what the effect is on us—every time anything happened we have to call up the Treadwell line and then they have to send a boat over across the channel no matter what the weather is to get over to the Sheep Creek plant and then throw the switch in. The reason for that I can't understand. They have a man at the powerhouse, who is certainly able to do it. [101—32] It

(Testimony of B. L. Thane.)

is a very great inconvenience, for instance last night it kicked out at half-past two and we were unable to get anybody on the island until this morning at nine—unable to get anybody who would waken Mr. Kinzie. That is an illustration of the situation of it. Our crew were shut down in the mine from half-past two last night until nine o'clock this morning.

Q. Now, how much experience, Mr. Thane,—what is necessary to put that circuit-breaker in so will—you understand—how much technical education is required?

A. All it takes is a man to grip hold of a handle and shove it in, that is all, and the same man that they have at their power-house throws in all of their circuit-breakers. They don't send a man over for that purpose—just for ours.

Q. Mr. Thane, you mentioned the circuit-breaker going out again last night. Just state the condition under which it went out last night.

A. Why, it wasn't our fault. There was a short circuit or something on their line which dropped the voltage and that kicked it out and they threw our line back in—threw our switch back in a few minutes, so the lights were on, but we couldn't get power to start on—a starting surge.

Q. That is, you couldn't get anybody?

A. No; couldn't arouse anybody. Mr. Pullen tried the power-house; he is my head electrician—and they said they wouldn't have authority to throw the switch in unless notified by Mr. Kinzie. Tried to get Mr. Kinzie and the watchman over there said

(Testimony of B. L. Thane.)

he wouldn't waken him at that hour of the night, and that was the way it went until this morning. [102—33]

Q. Do you know of any other place, Mr. Thane, in this vicinity where you could purchase electrical current for this operation? A. There is not.

COURT.—I will say at this time that pending this hearing I didn't intend that my order entered the other day should work as it apparently did work last night. If some one has to sleep, some one else should be appointed to whom notice can be given. If some one had to leave the defendant companies' plant for Seattle or Los Angeles, I wouldn't expect this notice to be given to that person, but some one else should be substituted as I want the spirit of the order complied with.

Mr. J. HELLENTHAL.—Your Honor doesn't understand the situation, I think; probably Mr. Thane doesn't understand it, but a short circuit came in last night and the men were busy all night working until this morning locating this short circuit. Wasn't any question of disregarding your Honor's order, or sleeping, or anything of that kind; simply a matter of electrical engineering—the steam plant was out and everything else was out.

COURT.—Well, that wouldn't change what I mean—what I said. Of course, if the power couldn't be furnished, I have no criticism—just a statement of the facts of it—a little amplification of what the order meant when it was entered.



(Testimony of B. L. Thane.)

Q. (By Mr. SHACKLEFORD.) Go ahead, Mr. Thane.

A. If it please, your Honor, we don't wish to be unreasonable about it either, because it is very disagreeable.

The COURT.—I don't wish to go into that part of it.

A. (By the WITNESS.) There is no question they could have given [103—34] us an order to get it because they put the switch there and the Sheep Creek plant was running and gave us lights—so far as their starting the plant is concerned or any other of their plants or the line wouldn't have prevented them from giving us the power to drive our plant last night immediately.

Mr. SHACKLEFORD.—I think that is all at the present time.

Cross-examination.

Q. (By Mr. J. HELLENTHAL.) Just one question before we adjourn for dinner, your Honor. Mr. Thane, do you know the Sheep Creek switch went out last night? A. The Sheep Creek switch?

Q. Yes.

A. I don't know about the Sheep Creek switch. I know ours went out.

Q. The circuit-breaker of the Sheep Creek power plant didn't go out last night, did it?

A. I think it did because Mr. Pullen told me this morning. I asked him about it and he has been working all last night trying to get somebody on the line and he said ours went out and theirs went out.



(Testimony of B. L. Thane.)

Q. You don't know anything about it from personal knowledge?

A. No; except Mr. Pullen who got in touch with them. He is my electrician, however.

Mr. J. HELLENTHAL.—That is all.

COURT.—No cross-examination?

Mr. J. HELLENTHAL.—Oh; it is only half-past eleven. I thought it was half-past twelve.

Q. Mr. Thane, what form of motor did you say you were employing [104—35] first, one question, all the work you have been testifying to that is under way by you is being carried on at what is called the Perseverance mine, is it not, Mr. Thane?

A. Yes; the Perseverance and Sheep Creek. Both places.

Q. Well, the drifts you are running and the raises you are making—the tunnels you are driving are all being driven in that Perseverance tunnel, isn't that true? A. Driving one tunnel at Sheep Creek.

Q. Now, what you have been testifying to—but the work at Sheep Creek? A. Yes.

Q. That was never one of the Oxford properties?

A. What is that?

Q. That was never one of the Oxford properties?

A. No.

Q. The Oxford Mining Company never had any interest in the Perseverance until this recent consolidation?

A. No, except that part of the development work we are doing is part of the Oxford and the Ground Hog group of claims adjoins it.

(Testimony of B. L. Thane.)

Q. You are not working in the Ground Hog group of claims any, to speak of?

A. We have actually worked in some of it and the stope is cut out in the Ground Hog claims. The stope where the Oxford has got their ore-way is in the Ground Hog claim which is part of the Perseverance.

Q. The place where your 200 men, or so, are now working is at the Perseverance property, isn't?

A. No; partly at the Perseverance and partly on the Ground Hog.

Q. How many men have you got employed on the Ground Hog?

A. I should say—I should say pretty close to a third part— [105—36] a third or a half.

Q. What are those men doing? A. Raising.

Q. Raising? A. And sinking.

Q. And sinking. A. Yes.

Q. All right. Now, what is the form of motor did you say—you have a General Electric form K motor, have you not? A. Yes.

Q. 200 horse-power? A. Yes.

Q. And you testified that was a motor in general use? A. Yes; a motor in general use.

Q. For the purpose of driving compressors?

A. For compressors of that size, it is; yes.

Q. Now, Mr. Thane, will you state whether or not you have had some mining experience—will you tell me what kind of compressors you have ever seen driven by form K motor, except the motor you have there at the plant where you are working?

(Testimony of B. L. Thane.)

A. Well, I will tell you about that—I don't recall having definitely looked at any definite compressors, but I will tell you one thing before we ordered all of the moters and all of our electrical equipment for the special purposes for which we use it, it was passed on by two of the best electrical houses and—

Q. Wait a minute, Mr. Thane; answer my question. I don't want to know who it was passed on it or advised you. You answered the question of Mr. Shackleford to the effect that is a form of motor in general use for the purpose of driving compressors? [106—37]

ing compressors. I said it was a form of motor in general use and I know it is in general use although I can't recollect any special place. It is used to drive small compressors and all such machinery as that.

Q. I am not asking you where did you ever see a General Electric form K motor in use for the purpose of driving a compressor?

A. I can't recollect a place.

Q. You don't know of any place?

A. Not just now.

Q. That is the only one you have ever seen. Now, Mr. Thane, you also stated that the form of circuit-breaker in general use on distribution lines, such as the Sheep Creek line, was a relay circuit-breaker?

A. I did.

Q. Time relay circuit-breaker? A. Yes.

Q. I will now ask you where did you ever see a

(Testimony of B. L. Thane.)

time relay circuit-breaker in use on a distribution line?

A. I have seen them at a good many power-houses.

Q. Where?

A. For instance, I have seen them at the Sheep Creek power-house.

Q. When did you see a time relay circuit-breaker in use at the Sheep Creek power-house on the distribution line?

A. They have them on their main line.

Q. The main line is not the distributing line though?

A. Yes; it is certainly. The main line has to run out; so do the distributing lines—to the various motors that come off of that line. [107—38]

Q. Did you ever see a time relay circuit-breaker in use here in Alaska or elsewhere in the distribution of electric current over a distributing line such as that with which you are connected with at the Treadwell power-house?

A. Yes; the same line goes through at Treadwell, that is a distributing line.

Q. Now, where did you see that?

A. I saw that at the Sheep Creek power-house on their panel.

Q. Now, where else?

A. Well, all I know is that on their main circuit line they use the time relay to go into their own power-house. You will see them even in a good many power-houses at different times—

Q. Is it not a fact—?

(Testimony of B. L. Thane.)

A. —even in a good many power-houses in the states and all about there, they have time relays on their main line.

Q. Well, I am speaking of the distributing line?

A. The main line is the distributing line; as a matter of fact, it is the line which carries your current out and then feeds off to the various motors which you use from them.

Q. Where are the lines which feed to the various motors, if you want to use that form—where did you ever see a time circuit-breaker in use?

A. Down here at Sheep Creek at your own power-house.

Q. On the line that feeds the motor from the main line?

A. That is your main system and your lines run from that to your motors.

Q. Now, let's get at this, Mr. Thane. Is it not a fact that the time relay circuit-breaker is a recent invention, comparatively [108—39] recent; that was installed only in connection with main lines that ran directly from the power-house to the distribution line for the purpose of giving the main line a chance when the other line goes out—so the feeder will go out before the main line?

A. You mean from a generating plant?

Q. Yes; a generating plant. A. That is true.

Q. That is true, is it not, Mr. Thane?

A. Our line comes off from your generating plant just the same as your line comes off from your generating plant; just exactly the same.

Q. The line connects—



(Testimony of B. L. Thane.)

A. Just the same as the line cuts off from Sheep Creek and distributes up here to the Alaska Juneau.

Q. Understand my question. The purpose of a time relay circuit-breaker is not to regulate the distribution of electricity but merely to give the main line a chance to stay in for a few minutes, if the other ones go out, is that not true?

A. Not regulating the distribution of the electricity.

Q. Now, for instance, you know probably that the Treadwell Company have a time relay circuit-breaker at Nugget Creek?

A. Yes; I presume they have. I haven't been there.

Q. That is the only—probably also knew that is the only time relay circuit-breaker they are using?

A. They have one at Sheep Creek.

Q. Except the one at Sheep Creek?

A. Haven't they got one from their steam plant too? [109—40]

Q. I don't know about the steam plant. I am speaking about their power plants. A. Yes.

Q. Now, from these main lines lead various distribution lines to the various motors?

A. Well, you may call them distribution lines. May be only one motor cuts off from that main line; may be the main line—what is it you are driving at—is a distributing line. Suppose only have one line going off to one line?

Q. Then there is no distributing line?

A. Then your main line is the distribution line.

Q. The main line furnishes power?

(Testimony of B. L. Thane.)

A. Main line is a distributing line.

Q. Doesn't the one distribute more than to the use of more than one motor. What would there be to distribute if didn't have more than one?

A. That is quite true, but your main line is the distributing line.

Q. Now, where lines lead from the main line they are usually called distributing lines—they distribute from the main line to the various motors? You know that is so?

A. No, they are distributing lines, also are main lines—just because you may have minor ones coming off from—

Q. Now, granting that the time relay circuit-breaker is used in connection with the main system, now did you ever know of a time relay circuit-breaker being used in connection with the minor system, as you call it? A. Certainly, I have. [110—41]

Q. Where?

A. This is just—the Sheep Creek plant is just a minor unit of all your units. There is one place right there.

Q. Well, now, Mr. Thane, let's understand each other. There is a main line running from Sheep Creek, is there not—a main electric line?

A. Yes, and it connects with another line from Nugget Creek.

Q. Yes, I understand, but just lose sight of Nugget Creek. There is a main line coming from Sheep Creek, is there not? A. Yes.

Q. On that main line there is a time relay circuit-

(Testimony of B. L. Thane.)

breaker, isn't that true? A. Yes.

Q. Now, on that main line are minor lines branching out to the various motors, are there not?

A. I suppose there are.

Q. Now, you have in your mind a clear distinction between the main line and the minor line, or what I call the general main line and the distributing lines. What I refer to as distributing lines are what you call the minor lines. Now, having that in mind, did you ever see a time relay circuit-breaker in use on a minor or distributing line in the sense that we are now using the term?

A. Why, I don't recall; but what you are driving at is whenever a line comes out of the generator it has a time circuit-breaker on it.

Q. No.

A. Yes; that is so because really your line is coming out of a plant where you are generating electricity and that is where you would have a time circuit-breaker; yes; all [111—42] right then, so our line will come out from your generator and right from the same generating house.

Q. You think that answers my question?

The COURT.—He answered that he had not seen it.

Q. (By Mr. J. HELLENTHAL.) Now, Mr. Thane, you are familiar with the form M and form P motors, are you not?

A. Yes; the form M; I never used the form P.

Q. Those are motors—form M and form P—are

(Testimony of B. L. Thane.)

usually used in connection with driving?

A. Not especially so; in fact form M is an especial motor with outside resistance and it especially provides for starting without a heavy starting surge.

Q. Exactly.

A. But it does take some starting surge. Though it doesn't entirely eliminate the starting surge it requires some, but not as much as the form K, and it has extra devices for that purpose, which are in some ways against the motor ruining it for practical purposes and it is not in such general use by any means as form K in ordinary practice.

Q. By a starting surge, you mean a starting peak or extra starting current, don't you?

A. Yes; but it is a different thing from the ordinary peak load; entirely different thing.

Q. Where did you get the use of that word "surge" from?

A. Oh, a surge is an ordinary English term which expresses the real meaning. It is a rush of current—the instantaneous rush of current—you can use surge; it carries the idea; a word that is in ordinary practice.

Q. You have no other distinction or meaning of that term?

A. No; it is just an ordinary term for that purpose. [112—43]

Q. You don't mean by surge an increase in the amperage? A. Yes; I mean—

Q. And voltage?

A. I mean the increase of current.

(Testimony of B. L. Thane.)

Q. You know as a matter of fact—

A. The rush of current.

Q. Why?

A. As a matter of fact, your voltage doesn't increase. It drops. Your current does increase on the start.

Q. Now, that is a surge? A. Yes.

Q. When your current increases and your voltage diminishes? A. Yes; that is right.

Q. You will get a surge?

A. That is the result; yes.

Q. The surge doesn't deal with horse-power. Mr. Thane?

A. Yes, deals with horse-power. If you measure it in watts the result—instantly there would be a raise in the amount of watts used instantly.

Q. There wouldn't be in a surge? Surge deals with capacity does it not and not with horse-power?

A. Well, horse-power is—horse-power depends so far as the electric current depends upon both—on the voltage and amperage.

Q. How is that?

A. And with other factors, but it depends on both of them, but in the ordinary meaning of surge—in the ordinary mind what you mean is the rush of current, that is what you mean—an extraordinary rush of current—a sudden rush of current. What actually occurs when that rush of current. [113—44] —what actually occurs when that rush of current goes through your line is the voltage drops, unless the voltage is kept up in some other appliances on your



(Testimony of B. L. Thane.)

bus-bars such as you have at Sheep Creek—there is an extra appliance there for the purpose of keeping the voltage up; otherwise it would drop.

Q. Now, how much horse-power, Mr. Thane, does it take to start your form K motor? A. Form K?

Q. Yes.

A. I don't know—that motor will start with considerably less than 300 horse-power. It will start with—it will start with 200 horse-power.

Q. If you get 200 horse-power.

A. It will start.

Q. —you can start?

A. Yes; on even less than that it will start all right enough.

Q. How much horse-power does it require to start you a week ago—three or four days ago when you started—do you remember that experiment?

A. Yes.

Q. Took about a 1,000, didn't it, Mr. Thane?

A. No, sir; it did not.

Q. Were you in the power-house when you started it?

A. No; but we have our own ammeters, voltmeters and wattmeter on our own board and had check-men to read them. Never took any such thing as that.

Q. How much did it take?

A. Why, a little. If measured that way I think your voltage holds up—your voltage is held up.

[114—45]

Q. I see; has to be—

A. No; doesn't have to.

(Testimony of B. L. Thane.)

Q. How would you go to operate a loaded motor?

A. Well, I will just tell you. Suppose you had a generator—a 300 horse-power generator which is now at the Sheep Creek plant—

Q. Yes.

A. —with a pipe-line that would only deliver 300 horse-power to us—

Q. Yes.

A. —you started that up and run it. You can't draw any more than 300 horse-power—that will start every motor on our line and work up to full capacity, but when we start this is what happens—

Q. Burns out the generator?

A. Not by any means.

Q. Well, what happens?

A. What happens—your amperage runs up and your voltage runs down and temporarily the machine slows up until the motor gets its speed; then both the motor and the generator come up to speed and that will happen within twenty seconds and we will get the full power out of it. No question about it.

Q. All right.

A. As it stands you have an outside—

Q. You get that same result, don't you, Mr. Thane, to a limited extent from the compressor that you have? A. You do so.

Q. To reduce—you have a compressor on that motor? A. Yes.

Q. That reduces your voltage? [115—46]

A. Yes; to a certain extent. We have a starting device for the purpose of starting up.

(Testimony of B. L. Thane.)

Q. How have you got that compressor set—how are you using it up there?

A. Using it according to ordinary practice; haven't watched them start that in person; have an electrician who has direct charge of that; haven't any occasion to doubt that he used the ordinary practice.

Q. What is the ordinary practice?

A. Well, it is to throw it over on one side of the feeder and then throw it back, the idea being to reduce the voltage temporarily somewhat, but that isn't sufficient—

Q. You can reduce the voltage more or less on the compressor?     A. Somewhat.

Q. According to the way you have the thing set, Mr. Thane, can't you?

A. Somewhat, but it isn't sufficient to start out when we have it set at unity power factor—56 amperes down there—that loss of current is almost instantaneous; that extra current that comes over their line is just like a flip (indicating) and that connects with your motor which is—well in just a little bit. Why, we start it all right and we didn't use over the 300 horse-power either.

Q. You would be using over 300 horse-power while you were starting, wouldn't you?

A. No; we would not. [116—47]

Q. You would not use over 300 horse-power?

A. No; I don't think we would; don't think you could measure it. You must remember that the indicator—these indicators that measure both the amperes and the volts and the watts are all—are very

(Testimony of B. L. Thane.)

delicate contrivances and fluctuate back and forth all the time, and in a second, or less one of these little needles will rush up like this. Now to try to read the high point that gets to in coming without taking the impetus that would receives to throws the current to that point; on the other hand you try to read the average of these which would give the current thereof; but what I do know is it does not take 300 horse-power to start that motor with ordinary conditions.

Q. It doesn't? A. No; it does not.

Q. And yet you know, Mr. Thane, that the circuit-breaker on your line is so set as to permit 300 horse-power to pass out and place 300 horse-power at your disposal? A. No, sir; I know it is not.

Q. It is not? A. No, sir.

Q. Now, tell me why it is not?

A. Well, that circuit-breaker—I will tell you—the Sheep Creek lines are in synchronism with your Nugget Creek and your Treadwell lines, when the steam plant is running. Now, I don't know what the power factor is over there. I know this, if we connected up with your line it would be affected as long as drawn off from that same synchronized current, we would be affected by your power factor, bound to be and couldn't get away from it. [117—48]

Q. Why?

A. Because we would connect up with the same juice that is in synchronism, so then we apply and receive part of it and we would be affected by your power factor and we don't even know what our own

(Testimony of B. L. Thane.)

power factor is except by taking an instantaneous reading. You see. Now, that power factor is going to effect what that power is. You have assumed a unity power factor. Your own generator I think is only set at 85 per cent power factor and yet you are allowing unity power factor for us, a theoretical condition.

Q. Assuming a unity power factor, Mr. Thane, there is 300 horse-power placed at your disposal, is there not?

A. If that condition exists, but it doesn't exist; that is the point.

Q. If what condition?

A. If the condition of unity power factor exists we would get it.

Q. Assuming a unity power factor.

A. If that condition did exist, but it doesn't, we would get—we could get 300 horse-power if had all the certain special devices that we would have to install.

Q. Now, what you mean, Mr. Thane, is this: While there is 300 horse-power placed at your disposal at Sheep Creek on the bus-bars—

A. There is not 300 horse-power.

Q. Now, wait a minute now until I get through, you will probably agree with me—you are not able to develop that into 300 developed horse-power?

A. There is not 300 horse-power placed at our disposal.

Q. Well, now, what is a horse-power, an electrical horse-power? [118—49]



(Testimony of B. L. Thane.)

A. It is seven-tenths of an ordinary horse-power; that is just the reverse ordinary horse-power is about seven-tenths of an electrical horse-power, being .746 kilowatts.

Q. You know the voltage at Sheep Creek, don't you, Mr. Thane? A. Yes.

Q. And you are familiar with the plant and the system down there?

A. I have been in the plant to see it.

Q. How did you figure the horse-power to be delivered down there?

A. I will tell you what we did down—

Q. How would you set that circuit-breaker to deliver 300 horse-power? A. To our line?

Q. Yes.

A. I will tell you exactly. The first thing I would put in would be a wattmeter, which doesn't register horse-power; right alongside of that I would put an ammeter. Now, with our loads there are on the line and the load, I would shove it up to where it would be the equivalent of 300 horse-power, which would be about 240 kilowatts. When 240 kilowatts showed on the wattmeter I would see what the ammeter read—how many amperes there were, and I would set my time circuit-breaker in accordance with the ammeter, and then I would correct that from time to time according as I had more motors on that line or to sustain more motors. That is the way it would be done, like that.

Q. Now, that wasn't exactly my question, Mr. Thane. We will get at that question. How would

(Testimony of B. L. Thane.)

you set the instantaneous [119—50] circuit-breaker in order to permit our motor to place at the disposal of the party or at the disposal of the line 300 horse-power? A. Why, I wouldn't set it.

Q. I understand, but if you were to set it, at what point would you calculate?

A. I wouldn't do it; I wouldn't do it.

Q. Well, how would you calculate the horse-power? A. The horse-power?

Q. Yes; you know the voltage and the amperage and all about it. Now, how would you calculate the horsepower?

A. I wouldn't calculate it. I would put a wattmeter in and then find out what it actually was. You can't calculate.

Q. Now, you know that an electrical engineer can calculate horse-power?

A. They can if they have certain factors and they can't find those factors without making actual tests for that purpose, or to have a wattmeter to see what we are doing.

Q. You know books of electrical companies give you formulas and tests which you use to figure horse-power?

A. On certain conditions and where certain facts are known?

Q. What facts?

A. Well, the first thing, do you know the power factor on your line?

Q. Do you know the power factor on your line?

(Testimony of B. L. Thane.)

A. No; I don't. I could figure it for a given instance.

Q. If you changed form K motor to form M motor be a different power factor? A. No; not a bit.

Q. Are not?

A. No, sir; there is exactly—the form M and form K motors [120—51] is exactly alike with one exception; that is one has an outside resistance for the use of starting; otherwise the motors are exactly the same type.

Q. All right. What is the power factor in a synchronous motor?

A. Well, a synchronous motor is figured to build up and allow a unity power factor.

Q. Exactly? A. Yes.

Q. If you used synchronous motors you could get 300 horse-power out the juice that is delivered to you from the bus-bars there, could you not—the power factor would then be unity, would it not?

A. The power factor would be unity using a synchronous motor.

Q. You would get your 300 horse-power, wouldn't you? A. Under certain conditions we would.

Q. You would get it off the power that passes and wouldn't knock out your circuit-breaker?

A. That hasn't got anything to do with the circuit-breaker. You have got to start a synchronous motor just the same as form M or form K.

Q. If your machinery was started you could utilize the entire 300 horse-power?

A. Yes; I think we could. I would have to con-

(Testimony of B. L. Thane.)

sider it. I think we could.

Q. If you would use that power for the purpose of electric lighting you could use the entire 300 horsepower, couldn't you, Mr. Thane?

A. Yes; if for electric lighting only.

Q. The power factor would be unity, would that not be true? [121—52]

A. Yes; in electric lighting.

Q. Isn't it a fact that the power factor depends entirely upon the use to which the current is put?

A. It does.

Q. And it is controlled by the use to which party using it? A. Yes.

Q. And is beyond the control of the party furnishing the current, is it not?

A. Yes; but wait a minute. One another thing, the power factor doesn't affect the actual horsepower delivered to us, not a bit; whether used for electric lighting and had a power factor of 70 per cent wouldn't affect the actual horsepower that we were getting; not a bit.

Q. It wouldn't affect it? A. No.

Q. The amperage and voltage?

A. By the power factor?

Q. Yes; if you—for instance, the circuit-breaker is set at 56, is it not, down at Sheep Creek?

A. Yes; figuring at unity power factor.

Q. Figuring at unity power factor? A. Yes.

Q. Figuring at unity power factor you are getting 300 horsepower, are you not, if that is placed at your disposal?

(Testimony of B. L. Thane.)

A. Figuring at unity power factor we could get out that; yes.

Q. There is 300 horse-power placed at your disposal? A. I think we could; yes.

Q. From the bus-bars? A. Yes, sir.

Q. Now, if you used your juice for electric lighting purposes [122—53] there is—the power factor would be unity, would it not? A. Yes.

Q. If you used a synchronous motor, the power factor would be unity? A. Yes.

Q. If you used a form K motor, the power factor—you don't know what the power factor is?

A. No.

Q. And if you use a form M motor, you don't know what the power factor is?

A. Well, you can figure it from your instantaneous readings.

Q. By experiment?

A. No experiment, by instantaneous readings of your ammeter and voltameter, but you understand if suppose we only had 70 per cent power factor, using a form M or form K motor, we wouldn't be getting any more actual horse-power than we would if we were taking that power over the line at unity power factor; you understand that doesn't diminish; in other words, you wouldn't be losing any horse-power coming over your lines whether we used it on motors, either form M or form K; not a bit.

Q. Provided you didn't take over 300 horse-power off the bus-bars? A. Exactly, in either case.

Q. In either case?



(Testimony of B. L. Thane.)

A. Yes. It wouldn't be affected because we had type form K or form M motor or using a synchronous motor.

Q. The only difference would be you wouldn't be getting that much power?

A. No; that isn't the point. As under the present condition [123—54] you are not giving us the power—you are not giving us 300 horse-power, if we were going to use lights and had 56 amperes on that circuit-breaker and allow us to start our juice, turn it into lights, we could draw 300 horse-power from you; see?

Q. Yes.

A. But on the ordinary way—with ordinary motors we are called upon to use 300 horse-power—you are the ones that are receiving the actual difference between what we ought to receive and what you are delivering us; so we are not the gainers. We are losers on that.

Q. In either case the 300 horse-power figured at unity power factor would be at your disposal on the bus-bars?

A. At unity power factor, provided you allow us to start.

Q. Yes or no?

A. For one purpose alone that would be, and that would be for lights.

Q. How about a synchronous motor?

A. Oh, very well, a synchronous motor—if we put that synchronous motor in there that synchronous motor would not alone be affected by our power fac-

(Testimony of B. L. Thane.)

tor for would be figured at such, but our power factor would be affected so long as your system is in synchronism with Nugget Creek and the power over there, and I wouldn't know how to figure what kind of synchronous motor have to use for that purpose, and there is an especial device, too.

Q. I wish you would explain to the Court, Mr. Thane, just how our power factor affects you—how it affects the flow of current that passes onto your line that you can get from [124—55] our bus-bars.

A. I will tell you. The power factor is a condition, Mr. Hellenthal, nothing else; it is a condition in the line due to induction loads, for instance, induction motors, and it is due to the lag of the—what is the word I want to use—the current keeps back its direction so many cycles.

Q. Yes.

A. It is due to the lag of that current. Now, this condition of power factor exists—how power factor is—if we brought the power factor up to unity, don't you see, it would help—it would help your generator in your plant and not us; that would be the plant would be helped—your generator—by bringing it up, if we were able, which I doubt it would be possible for us to do on account of your own induction motors which you have on your system—if we were able to do that, say that we were, it would be your generators at Sheep Creek which would be helped; that is the thing which would be helped; that is, they put

(Testimony of B. L. Thane.)

these synchronous motors on at times to help the generator, so that the generator has more capacity, that is to say, that you can put more power against it and it can generate some more current. It helps out the generator so and extends the capacity without heating; that is why they put these synchronous motors on the line to help the generator.

Q. That is the only explanation you have to offer how our power factor on our power line would affect the distribution of electricity over our bus-bars?

A. Well, I answered that; so long as our system is taken off your line, which is in synchronism that will continue to [125—56] be affected by the same things which exist on your line, and it will be affected by your power factor, and now your power factor is not unity. It is about 70.

Q. Now, Mr. Thane, my question is whether or why should that be affected?

A. Because it is connected with your general system and also your induction motor over there affects your system and there affects us.

Q. (By the COURT.) In what way?

A. Because it is a part of the same system. It is just the same as any part of their system over there and it is connected with it and it is in synchronism.

Q. (By Mr. J. HELLENTHAL.) Isn't it quite possible, Mr. Thane, for a branch line to have a unity power factor and the power factor on the main line be something else?

A. I don't think so. I know so long as our line comes off from your bus-bars—comes off from your

(Testimony of B. L. Thane.)

bus-bars and your Sheep Creek plant is in synchronism with your Nugget Creek and your steam plant there and your system has a certain power factor due to its induction load, due to the various motors which you have on it and other conditions, and we feed off the same bus-bars, I can't see why our line isn't affected by the same power factors that yours is, and I believe it is.

Q. You give it as your opinion that it is?

A. Yes; I give it as my opinion that it is and in order to correct that power factor have to correct the power factor for the whole or in order to bring ours up to the unity. That is the idea. What would be helped would be the generator.

Whereupon Court took a recess until [126—57] two o'clock of this same day; and thereafter court again convening pursuant to adjournment, all parties being present as heretofore, further proceedings were had, as follows:

Q. (By Mr. J. HELLENTHAL.) Mr. Thane, before lunch I was inquiring of you concerning the matter of power factors. For the purpose of clearing up the record I wish to ask you what you mean by power factor—by the term power factor?

A. Power factor is the ratio between the apparent power and the actual power.

Q. It is the difference, Mr. Thane, between the power actually produced in the first instance and the power present on the line? A. No.

Q. And the power utilized or developed, is it not?

A. No; it is the ratio between the two.



(Testimony of B. L. Thane.)

Q. The ratio?

A. The way I understand it, Mr. Hellenthal, is this: There is, so to speak, in the line a wattless current which is caused by an induction load, that is, when you speak of an induction load meaning a load of the induction motor and that this wattless current exists in the line all the time. It doesn't produce power at all; not a bit. It doesn't make power. It exists in the line and it is due to the lag which is caused by the phases from the alteration of the line, but it doesn't produce power; not a bit. Now, the idea of trying to get unity power factor—

Q. Now, before we go on with that, Mr. Thane, I want to get this matter so I understand what you mean by power factor clear. [127—58]

A. Yes.

Q. Is not this your understanding of a power factor, that it is the ratio between the power generated and taken from the bus-bars and the power actually developed?

A. No; it is the ratio between the apparent power and the actual power. The only power you could get from the bus-bars would be the actual power, that is, all you could get from the bus-bars would be the actual power because that is all that would go there.

Q. Doesn't it represent, Mr. Thane, the power that is lost in developing? A. No, not all.

Q. The power not utilized?

A. No, not at all. It is not a question of efficiency at all. There is no lost power there; not a bit.



(Testimony of B. L. Thane.)

Q. In the case of using power in connection with the operation of a synchronous motor? A. Yes.

Q. Or in connection with the development of electric light? A. Yes.

Q. The power factor is unity, is it not? A. Yes.

Q. That is to say the actual power obtained?

A. Yes.

Q. Is the same as the power produced?

A. Yes, that is correct.

Q. That is correct, is it not?

A. Yes, but remember electric lights are not inductive loads and there is no condition which causes power factor in that system. [128—59]

Q. I know, but in the case of using an inductive motor, whether it be form K, form M, or form P, the power actually produced is not equal to the power generated in the first instance?

A. Yes, it is. Yes, it is.

Q. Well, put it this way then—it is not equal to the power that would be developed by a synchronous motor from the same current?

A. That is if you put a synchronous motor on the line why all you would correct would be the power factor, that is to say this condition in the line that is all that you would correct.

Q. You would have no loss? A. No, not a bit.

Q. In the case of an inductive motor there is always bound to be a loss of more or less, is that not so?

A. No, not at all. It is only the loss that is due to the inefficiency of that machine—that is our loss

(Testimony of B. L. Thane.)

and not the loss of the line—at the circuit-breaker.

Q. We are not talking about line losses and things of that kind. What I am trying to get at is what is meant by power factor?

A. There is no loss due to the power factor; not a bit.

Q. There is no loss due to the power factor?

A. No.

Q. What figure does it cut?

A. Well, it is a condition of the line. Well it is—I don't know as I am capable of giving you an analogy.

Q. (By the COURT.) See if you can do it this way. You tell me there is power efficiency in one plant of 75 and in another 85. Now what makes the difference, if you know? [129—60]

A. Well, that is caused by a difference of your inductive load, that is the inductive motor you would have on your line would make the difference whether your power factor is 85 or 70 or 60. Now, this is what they tell you to do with your inductive load. You have to go back to your generator plant system—in your line you have a generating plant and the machine is designed to produce so many horse-power or so many kilowatts, and it also has to be designed that it won't overheat in carrying a certain amount of current—the machine won't overheat the phase wires in this generator, not motor—this is a generator, so it won't overheat, you understand.

Q. Keep from burning out?

A. Yes, and now very often when a company has a

(Testimony of B. L. Thane.)

generator of its own and a certain motor load distributed about—after a while it finds that it has a certain power factor on its line, say 60 per cent or 70 per cent. Now, that is this wattless current that is flowing through the line on account of the inductive motor that causes this power factor. Now, I could bring the power factor up to unity. The only results that you would get out of that is to increase the capacity of the generator—of your generator—of your own generator. Now, that doesn't mean that when you increase the capacity of the generator that you get more power out of it. The only way you can get more power out of it is by adding more power to the generator, you see, but that same generator which you had originally placed in there would, by bringing your power factor up to unity, be capable of generating more current, provided you put more power; that is, you correct this condition in there [130—61] and therefore your generator is in a condition to generate more power if you put more power on it.

Q. (By Mr. J. HELLENTHAL.) According to your testimony, Mr. Thane, the power factor existing in any particular case is due to a line condition?

A. It is a wattless current.

Q. Flowing in the line? A. Yes.

Q. And has nothing to do with the motors—the motors don't affect it?

A. The motors are responsible for that. The motors are responsible for that. They cause it, affecting the phases of the current as they vibrate, makes them lag a little bit, which causes this condi-

(Testimony of B. L. Thane.)

tion, but it isn't a question of a loss of power. Not a bit at all.

Q. It is a question of being able to utilize the power?

A. No; it goes back to the generator, that is all; it affects the generator, that is all.

Q. Don't affect the motor? A. No.

Q. If you are given 100 horse-power at a given place, how would you measure it?

A. Measure by watts.

Q. 100 horse-power, so many watts? A. Yes.

Q. Multiply by so many volts?

A. Amperes multiplied by so many volts.

Q. That gives you the horse-power?

A. Yes; the electric horse-power.

Q. But it doesn't make any difference what the horse-power is according to that view to have the required horse-power? A. Yes. [131—62]

Q. Is that true?

A. If—if—that would be true.

Q. Now, there is just one question, Mr. Thane, that I asked you about this morning. I want you to think it over carefully, because I want to say that there are some engineers here that don't agree with you, if you understood correctly. I want to know whether you understood correctly. Assuming that there is a certain power factor existing on your line in connection with the use of your form K motor attached to the Sheep Creek plant and assuming that your line is attached to the bus-bars, gets its power direct from the generator, you don't mean to say, Mr. Thane, that

(Testimony of B. L. Thane.)

your power factor is affected either one way or the other by the fact that the Alaska Treadwell Co. and the other defendant companies also have a wire attached to that same bus-bar and used inductive motors, so that there is a power factor existing inherent in their current? A. Yes.

Q. You don't mean to say that the power factor that exists in their current by reason of their motors that induces the power factor in that part of the electricity generated and which they used, in any wise affects the power factor that exists in your line, do you, Mr. Thane?

A. Well, I said that was my opinion, and I may be wrong about it, but I was looking at it this way. For instance, if we raised our power factor, we would necessarily change the power factor somewhat of the generator and as that generator is connected with their system so that their power factor affects it and would be changed. Now what [132—63] that change would be, I couldn't say offhand. That would be my opinion.

Q. Your opinion is that it would be so affected?

A. My opinion is that it would be affected.

Q. Have you any authority, Mr. Thane, upon electricity that would bear you out in that matter?

A. No, I can't think of any. That would take a specialist to analyze that particular condition. I am just considering the effect of our power factor with the effect on their generator.

Q. Can you now give to the Court your special reasons for your opinion on that subject?



(Testimony of B. L. Thane.)

A. I just tried to give it to you. Whenever our power factor in our line is changed it would change the power factor of the generator somewhat, have to do it, because the generator is a part of our system as well as theirs and in fact that generator is the same generator, is a part of their system. I can't see but what that would affect it—affect their system, or their system would affect it.

Q. Remembering always, Mr. Thane, that the circuit-breaker at Sheep Creek is so set, assuming that it is so set, as to permit the uninterrupted flow of 100 horse-power, then would it still be affected, your power factor, by the power factor on the defendant company's lines?

A. Well, I was of the opinion that it would. I may be mistaken about that. It is a very technical question. I was of the opinion that our power factor would affect the generator. I am sure that it would do that. I am sure that our power factor would affect the generator somewhat, just how you would measure that would be difficult, but would affect the generator which is part of [133—64] their system. Why there would be the effect all the way through. That is the way I arrived at that.

Q. Well, now, Mr. Thane, let's go off onto another subject again now. You know the voltage at Sheep Creek, do you not? A. Yes, approximately.

Q. 2300?

A. Between 2300 and 2400. They raise it sometimes.

Q. Well, assuming it is 2300. You know the am-

(Testimony of B. L. Thane.)

perage at which the circuit-breaker is set—56?

A. Our circuit-breaker, the one that is on our line?

Q. Yes, on your line?

A. Why, Mr. Kinzie told me what it was set at.

Q. 56? A. Yes.

Q. Now, Mr. Thane, that would permit the uninterrupted flow of 300 horse-power, would it not?

A. No, sir.

Q. Now, do you figure—well, let's go through to another thing— The electric unit is a watt, is it not?

A. Yes.

Q. 746 watts? A. Yes.

Q. Accordingly you mean horse-power, electric horse-power, that is right, is it not?

A. That is correct.

Q. A watt constitutes one ampere with the voltage at one, does it not?

A. Yes, the multiple of voltage by the amperes.

Q. Then if you multiply the number of amperes by the voltage you get the number of watts, do you not, Mr. Thane, is that no right? [134—65]

A. Yes.

Q. Then if the number of amperes is 56 and the voltage is 2300 and just one other element in a three-phase circuit, such is the case, and you are familiar with the plant there? A. Yes.

Q. You have to also multiply by the square root of three?

A. Well, in a three-phase system, also by power factor. You have to add that element too.

Q. (By the COURT.) What?

(Testimony of B. L. Thane.)

A. You have to multiply by your power factor.

Q. (By Mr. J. HELLENTHAL.) Now let's see.

A. You left that out.

Q. Do you mean to say, Mr. Thane, that in multiplying the number of volts—the number of amperes by the number of—by the voltage? A. Yes.

Q. You would not get the number of watts?

A. No, you have to multiply by the power factor as well.

Q. By the power factor as well? A. Yes.

Q. Where do you get your authority for that?

A. Well, that is—I think any up-to-date electric book will show that is the way you get your actual horse-power.

Q. All right. Let's see. Mr. Thane, I wish to call your attention to a book that I have here, The Standard Underground Cable Co., Pittsburg; I wish to have you look at that, and state whether you regard that as a standard work on the subject.

A. I wouldn't be able to say until I had taken it up and looked into it. [135—66]

Q. What. You can do that in just a moment, can't you?

A. This is apparently. It has price lists of insulated wire—apparently a catalogue, that is all.

Q. You wouldn't regard that as an authority?

A. Well, let's see. I haven't had a chance to see. No, I wouldn't regard that as an authority, because it is nothing more or less than a catalogue and covers many other subjects. Just simply goes into it briefly.

Q. All right.

(Testimony of B. L. Thane.)

A. Let me see what it has here.

Q. Yes, you may see it.

A. Remarks here "except where there is current electric motor force," you will notice at the bottom of that.

Q. Well, you don't regard that as an authority. We will turn to this one.

A. That thing there is considering power factor. It is right there.

Q. Now listen, Mr. Thane, I have a book here, Lectures of Mr. Briesdale. Look at that book and see if you regard that as an authority on electricity.

A. I wouldn't be able to say, Mr. Hellenthal. It looks as though it might be. It is apparently a discussion of alternating currents, or alternating current theory.

Q. Do you regard that as an authority?

A. I presume it would be, yes. I haven't any reason to say that it isn't, undertaking a discussion like that.

Q. Now, I call your attention to this part that I have marked on page 170 and ask you to look at it and say if that changes your mind any upon that subject. [136—67]

A. Yes, but this here mentions power factor.

Q. All right.

A. It discusses that it has two special conditions right here.

Q. Where the power factor is unity, Mr. Thane, how would you proceed?

A. Well, where the power factor is unity there

(Testimony of B. L. Thane.)

wouldn't be any lag.

Q. Yes.

A. For instance, this here takes into consideration "We shall therefore proceed to find the relation between the power and the current, and although would be possible to have all these to do we shall find it convenient to start with one special case. Firstly, when they are in phase." That is the point right there.

Q. All right, I think we agree, Mr. Thane. In determining the horse-power you multiply the number of amperes by the voltage by the square root of three in a three-phase machine?

A. A three-phase system, yes.

Q. And where the power factor is unity, you have nothing to multiply by?

A. You multiply by 100 per cent power factor.

Q. That doesn't change the result?

A. Well, then you get 300 horse-power, that would be the condition where your power factor was unity.

Q. Now, listen. Let's get back to the Sheep Creek plant. Now, the amperes that were delivered at Sheep Creek are 56, assume that.

A. Assuming that as so, I said, of course.

Q. The voltage is 2300? [137—68] A. Yes.

Q. Multiplying 56 by 2300 by the square root of three by one hundred per cent power factor, power factor unity, you get 300 horse-power, do you not?

A. It would if you had 100 per cent power factor existing there.

Q. We are assuming that.

A. Oh, yes, that is right.



(Testimony of B. L. Thane.)

Q. If the power factor is unity? A. Yes.

Q. You get 300 horse-power, is that not true?

A. Correct.

Q. If the circuit-breaker at Sheep Creek is so set as to connect the uninterrupted flow of 56 amperes, the voltage being 2300, with that three-phase machine that they are using there, assuming the power factor to be unity, you get 300 horse-power, is that not true?

A. It would, if the power factor was unity—it would.

Q. All right, now. Now, Mr. Thane, in the construction of a contract where no power factor is mentioned, do you know what the power factor is presumed to be?

A. Yes, it would be presumed to be what it actually was.

Q. What authority, Mr. Thane, on electrical engineering have you for that statement?

Mr. SHACKLEFORD.—We object to that question.

The COURT.—Objection overruled and exception allowed.

Q. (By Mr. J. HELLENTHAL.) What authority have you for that statement?

A. Just the authority of ordinary common sense.

Q. You have no other authority?

A. I don't know of any authority. Would you repeat the question again? [138—69]

Q. The question is this: In a case of a contract that mentions no power factor, is it not a fact that the

(Testimony of B. L. Thane.)

power factor is presumed to be unity?

A. I don't think so. I am sure it isn't.

Q. What authority have you ever seen that holds to the contrary?

A. Well, I don't recall any authority. The only authority that you can take would be the authority of ordinary practice.

Q. Where in ordinary practice have you ever seen such a contract besides the one at Sheep Creek?

A. Well, in ordinary practice, as a matter of fact, the way contracts are drawn up between electrical men and electrical companies things are accounted for, are spoken of.

Q. They are mentioned. The power factor is mentioned in the contract, is that not true?

A. Some contracts I presume that it is.

Q. But where it is not mentioned, is it not a fact that under all the authorities on that subject that the power factor is unity? A. Not that I know of.

Q. I have here a book called the Standard Handbook for Electrical Engineers, to which I call your attention. You probably regard that as a standard work, do you not, Mr. Thane?

A. It is a handbook.

Q. You are familiar with this book, are you not?

A. I have seen the book. It is a handbook. It is not an authority. It is a handbook, simply lays down certain points in connection with electrical appliances.

Q. Upon those points that it lays down it is regarded as authority, [139—70] is it not? Upon

(Testimony of B. L. Thane.)

those it is regarded as authority, is it not, Mr. Thane?

A. Yes, it is used for practical purposes.

Q. I now call your attention—

A. Sort of a quick reference book.

Q. I call your attention now to section 88 at the bottom of page 1171, Mr. Thane, and ask you to read that and see what it says. Read it out, Mr. Thane, so we can all hear.

A. It is a note under "The efficiency" and it is defined as "Definitions." It says that "Since the apparent efficiency of apparatus delivering electric power depends upon the power factor of the load, the apparent efficiency, unless otherwise specified, should be referred to a load power factor of unity."

Q. Now, let me call your attention—

A. That is referring to efficiency you understand, and not to power. That is referring to efficiency.

Q. What is the difference between power and efficiency, Mr. Thane?

A. Altogether different things. Efficiency means that percentage towards perfection so to speak; hasn't got anything to do with the power. The meaning of power—

Q. Are you familiar with Mr. Foster's book, Mr. Thane? A. I have seen it.

Q. You regard that as good authority, do you not?

A. It is a handbook.

Q. Now, I call your attention to the part that is marked here on page 507 and ask you to read that.

A. That is repetition, apparently the same thing. You see these handbooks are sort of little short state-

(Testimony of B. L. Thane.)

ments of directions for electricians to stick in their pocket [140—71] and run around with for practical purposes; not real discussions of the subject at all.

Q. Mr. Thane, if you will examine this book a little more closely you will find that what you have been reading from are the standardized rules adopted by the American Institute of Electrical Engineers.

A. Yes, it is.

Q. And merely stated in Mr. Foster's book. You see that there, Mr. Thane? A. Yes.

Q. That statement—the rules that I call your attention to are the rules adopted by the Institute of American Engineers, are they not?

A. Yes, I think so.

Q. It is, and that is pretty good authority, is it not, Mr. Thane?

A. Yes. This is the same as the other; it says since the apparent efficiency of that line—we are not discussing the efficiency, when we are speaking of what the power factor is—this is the efficiency of the apparatus, for instance, a machine may have an efficiency of 70 per cent or 80 per cent, that doesn't—has no relation to power factor.

Q. I know, but read that whole paragraph.

A. "Since the apparent efficiency of apparatus delivering electric power depends upon the power factor of the load, the apparent efficiency, unless otherwise specified, should be referred to a load power factor of unity."

Q. "Load power factor of unity" should be re-

(Testimony of B. L. Thane.)

ferred to—isn't that what it says?

A. Yes. [140½—72]

Q. Now, I will call your attention, Mr. Thane, to one of the other rules adopted by the American Institute of Engineers as those rules are reported in this handbook—not under the head of Efficiency, but under another head. I call your attention to rule 74 there. Will you please read that out and see what it says. Read it out, Mr. Thane.

A. All right. "Alternating current apparatus should be rated in kilowatts, at 100 per cent power factor; i. e., with current in phase with terminal voltage, unless a phase displacement is inherent in the apparatus, or is specified." Well, now when your power factor is below unity why there is a phase displacement.

Q. Exactly.

A. "If a power factor other than 100 per cent is specified, the rating should be expressed in kilovolt-amperes and power factor at rated load." Well, that is correct, it is all right.

Q. If a power factor then, Mr. Thane, you agree with this statement, that the power factor is not specified the apparatus should be rated at 100 per cent power factor? A. Unless—

Q. Unless what? What is the other?

A. Unless there is a displacement due to the phase which is due to the power factor, unless that factor exists in the system and it does exist in the system when you have a power factor less than unity.

Q. What is a phase displacement?



(Testimony of B. L. Thane.)

A. Well, that is this lag which occurs, that is all.

Q. That doesn't mean power factor?

A. That is the cause of power factor. The lag, that is what causes the condition of power factor.

[141—73]

Q. You know there is no such thing as a phase displacement over there at Sheep Creek, don't you?

A. Well, I know there is a lag in the alternations which causes this power factor. There is in their system and there is in ours.

Q. That isn't the phase displacement, is it?

A. Yes, it is the phase displacement.

Q. Now, Mr. Thane, to go back to power factors—is it not a fact that what the power factor—we will direct it to this specified case down there at Sheep Creek because I think it will result in less confusion than to cover more territory. Is it not a fact that the power factor that exists in the Sheep Creek line, in your Sheep Creek line I mean, depends upon the use to which the power is applied by you?

A. Yes.

Q. That is true, is it not?      A. That is true.

Q. If you applied it to one use the power factor would be a given power factor?      A. That is right.

Q. If you applied to another use the power factor would be something different?

A. When you speak of use you mean what type of machines that we are using on the line and how many of them?

Q. Yes, the various kinds.

A. Motors—different kinds of motors?

(Testimony of B. L. Thane.)

Q. Exactly.

A. So that affects the power factor?

Q. The power factor is even so variable that it is not the same one day and another in the same machine, [142—74] is that not true?

A. It would change according to the load that you were using on that machine.

Q. Exactly. Your 200 horse-power motor?

A. Yes.

Q. Would have a power factor one day of—a given power factor and the next day it might have a slightly different power factor? A. That is true.

Q. And another day still another power factor?

A. Yes.

Q. And the next day still a different power factor, depending upon the use you made of the power, is that not true?

A. That is true, but that would not affect the power.

Q. Wait a minute, I am talking about the power factor now. Then the power factor again depends upon the type of machine that may be used?

A. Yes.

Q. Upon the place at which it is used, is that not true?

A. Why, I don't think the place has any particular difference.

Q. That would affect the line loss probably more than the power factor? A. Yes.

Q. In some places, that is to say, the power could be placed to such use that the power factor would be

(Testimony of B. L. Thane.)

unity? A. It could, yes.

Q. And again it might be placed to such use that the power factor would be very low, is that not true?

A. Yes, 60 per cent.

Q. 60—50 per cent?

A. Well, I don't know of any place like that, but I presume that could happen. [143—75]

Q. All these things as to what the power factor is at any given time depends entirely upon the use which you make of the power and is entirely beyond the control of the defendant companies, is that not true? A. No, that is not.

Q. What control have they over the use that you are to make of the power?

A. Well, for example, they might—they might put in a synchronous motor in their power-house and float it on our line and by the use of that regulate the power factor at such a point as they would like.

Q. Well, there is no way in which the defendant companies have anything to do with the lack of machinery that you are using, have they, Mr. Thane?

A. No.

Q. Or with the load that you place upon your motors? A. Up to 300 horse-power, no.

Q. Or with the place where you use your motors?

A. No.

Q. They could not—it is none of their concern whether you use a synchronous motor? A. No.

Q. Or whether you use an inductive motor?

A. No.

Q. Or whether you use the power for electric light-

(Testimony of B. L. Thane.)

ing purposes? A. No.

Q. That doesn't—

A. They might if we used a synchronous motor, it would help their generator—they might have something that they would like. [144—76]

Q. They might like it, but they couldn't compel you to do it, could they, Mr. Thane? A. No.

Q. You actually do use some of this power for lighting purposes? A. Yes, use it sometimes.

Q. Use some of it for lighting purposes?

A. Yes.

Q. To the extent of what you use for lighting purposes you get 100 per cent power factor?

A. It is the average power factor that shows up in a line due to all the loads on a line.

Q. To the extent of what you use for lighting purposes you get 100 per cent power factor?

A. If that were alone, would get 100 per cent.

Q. To the extent you use your form K motors in the Perseverance the power factor is less than 100 per cent? A. No.

Q. Do you know what it is?

A. I think it is about 72 or 73 per cent considering all the loads that we have on the line, that is the motors and the lights and the transformers, you see.

Q. It varies so you can't tell just what it is from day to day?

A. You see, even a transformer will affect the power factor unless loaded up to full capacity.

Q. You have two transformers, have you not, on that line? A. Yes.

(Testimony of B. L. Thane.)

Q. In transmitting the power from Sheep Creek to the Perseverance you have first your line losses, do you not, Mr. Thane?

A. Yes, that is our loss. [145—77]

Q. That is your loss. You calculate that is your loss?

A. Certainly, you only deliver us so much power and all we get up above would be what we get plus the line losses.

Q. You also have your transformer losses, have you not? A. Yes.

Q. How much are those line losses and transformer losses?

A. Well, I don't know just—I would have to refer to the records to see just what they were.

Q. You wouldn't be able to tell?

A. Not offhand. They are not unusual. They are the ordinary line losses and transformer losses. We have standard equipment for that purpose.

Q. Yes. Now, if the power—if the power factor were regarded as unity you would be getting 100 horse-power at the Sheep Creek bus-bars at the present time, assuming it to be unity?

A. Assuming it to be; yes.

Q. That is correct? A. Yes; very close to it.

Q. That is within so little that it wouldn't make any difference? A. Yes.

The COURT.—Being at 100?

Q. (By Mr. J. HELLENTHAL.) 300?

A. 300.

Q. I mean 300.



(Testimony of B. L. Thane.)

A. We are not actually using that, but we could, assuming the power factor was unity with 56 amperes, we could use 300 horse-power. [146—78]

Q. The reason the power factor is not unity is because you are applying the power to some use that produces a lower power factor, is that not true?

A. Yes, just ordinary mining uses.

Q. Ordinary mining uses? A. That is right.

Q. Now, and the question of what those uses shall be is entirely beyond the control of the defendants, that is in your power exclusively?

A. Yes, just ordinary mining uses.

Q. Now, Mr. Thane, let's get down to the wattmeter. You said something this morning about the proper measure or measuring of the electric current. In your judgment you said, I think, if I understood you right, I might be mistaken, you thought the defendant companies should, instead of installing a circuit-breaker that goes out when more than 56 amperes passes through the line, over the line, should install a wattmeter?

A. No; that is not what I said, at least I didn't mean to say that. What I said was that our power should have *to measured* by a wattmeter and for ordinary practical purposes right alongside of the wattmeter would be an ammeter. Now, when that wattmeter read 220 kilowatts, which is equivalent to 300 horse-power, or practically so, the ammeter would show for practical purposes a certain number of amperes at that instant.

Q. Yes.

(Testimony of B. L. Thane.)

A. You take that number of amperes, as shown on that ammeter, and use that in your circuit-breaker, but you would not figure it at 56. It wouldn't be 56 either. Couldn't be 56. [147—63]

Q. Your wattmeter would take into consideration your power factor?

A. No. All the wattmeter measures is the exact power which we would get absolutely—the exact power which we get.

Q. Takes into consideration the power factor, is that not true? A. Yes, that is right.

Q. Assuming the power factor to be unity, it would not measure the power?

A. Oh, yes, it would. Doesn't make any difference what your power factor is, your wattmeter measures your exact power you are delivering on that line—the exact power.

Q. Now listen, the wattmeter measures the power you get in kilowatts?

A. Yes, the same as horse-power.

Q. And takes into consideration the power factor?

A. Yes.

Q. Now, if you were using your entire 300 horse-power places at your disposal and furnished you for lighting purposes, the wattmeter would indicate that you were using the equivalent of 56 amperes?

A. No, what would happen: your wattmeter would show 224 kilowatts, at the same time your ammeter showed 56 amperes.

Q. Your wattmeter would show 220 kilowatts and your ammeter would show 56 amperes, is that right?

(Testimony of B. L. Thane.)

A. That is correct.

Q. Well then, when you changed your use from electric lighting to a synchronous motor your wattmeter would still continue to show 220 kilowatts and your ammeter would continue to show 56 amperes, is that right?

A. If you had a synchronous motor on the line which would— [148—80] if you had it so arranged that the synchronous motor would bring up the power factor to unity.

Q. Yes, exactly.

A. If you—if that is possible to bring the power factor to unity.

Q. Bring it very approximately, Mr. Thane?

A. Yes, approximately, yes.

Q. Well, when you did away with the synchronous and installed a form K inductive motor—

A. Yes.

Q. Then your wattmeter would show 220 horsepower? A. Yes.

Q. Your ammeter would show what?

Q. (By Mr. SHACKLEFORD.) Show 224 kilowatts?

Q. (By Mr. J. HELLENTHAL.) 224 kilowatts. Your ammeter would show what?

A. The ammeter—I don't know exactly what it would show, but assuming 70 per cent power factor probably would show between 70 and 80 amperes.

Q. Between 70 and 80 amperes?

A. Yes, somewhere along there.

Q. Then—

(Testimony of B. L. Thane.)

A. But your wattmeter would only be showing 224 kilowatts, which is 300 horse-power, that is all it would show.

Q. Exactly, but the ammeter would show 70 or 80 amperes? A. Yes.

Q. Now— A. Somewhere along there.

Q. Then if you changed your use from the form K motor to some other form of motor that had— where the power factor would be greater— [149—81] A. Yes.

Q. The ammeter—the wattmeter would still continue to show the 224 horse-power?

A. Yes, that is correct.

Q. The ammeter would show something less in amperes than what it showed on the former occasion, would it not?

A. It would depend upon the power factor. If the power factor changed any it would.

Q. The actual amount, not of power, now, but the actual amount of the electric current—I want to get this thing so as to agree with you on this point—the actual amount of electric current furnished in the case of a lighting plant or the synchronous motor would be 56 amperes at a voltage of 2300, is that right? A. I think that is correct, yes.

Q. The actual—

A. That is if your synchronous motor was arranged so that it would bring your power factor up to unity.

Q. Exactly, but this unity—the actual amount of electric current used in the case of a form K motor,

(Testimony of B. L. Thane.)

assuming it to be about 80 per cent power factor, so that you say it would come up to about 80 amperes, wouldn't it, Mr. Thane?

A. I think that is about what it would be, somewhere along there.

Q. Would then be approximately 80 amperes with a voltage of 2300, would it not? A. Of that motor?

Q. Yes.

A. No, not necessarily. You see the power factor is a condition that exists all through your line. It is not [150—82] caused just by one special machine unless that was the only thing that was on your line. For instance, your transformers would affect it somewhat and even the line has a very slight effect on them.

Q. I know, but eliminating those matters and speaking only of power factors,—the flow of current would be affected to a certain extent—would be enlarged to a certain extent, that you would probably be getting 80 amperes instead of 56 at the same voltage of 2300?

A. Yes; that is just exactly the reason you can't use an ammeter to measure power with. Just exactly the reason. That is why you have to use a wattmeter.

Q. You are given an increased flow of current?

A. But no more power.

Q. You are getting an increased flow of current?

A. But no more power. You wouldn't get any more amperage.

Q. Get more amperage and no more voltage, is



(Testimony of B. L. Thane.)

that not true? A. No.

Q. The voltage remains the same?

A. The voltage remains the same.

Q. And you would get an increased flow of current, that is true, is it not?

A. More current comes in over, but no more power.

Q. Now your wattmeter doesn't measure the amount of power taken at any time?

A. Yes; it does.

Q. Listen now until I get through, then I think you will agree with me—but measures the amount of power per kilowatt hour, does it not, Mr. Thane?

A. No; that is the way it is ordinarily. It depends on the wattmeter, but an ordinary wattmeter measures the power at any instant. [151—83]

Q. You can go up and see the peak?

A. At any fraction of time.

Q. But doesn't prevent their overdrawing?

A. No.

Q. For instance, if the defendant companies were to install a wattmeter at Sheep Creek there would be nothing to prevent you from drawing 600 horsepower? A. Oh, yes, there would.

Q. What would it be?

A. I just told you a moment ago right along side of your wattmeter—

Q. (By the COURT.) You mean to assume there was nothing on there but the wattmeter?

Q. (By Mr. J. HELLENTHAL.) Assuming that the wattmeter is the only thing to break the current, the wattmeter wouldn't break the current?

(Testimony of B. L. Thane.)

A. No; the wattmeter would not break the current.

Q. There is nothing to prevent your taking 600 horse-power?

A. If you had no other instrument but the wattmeter.

Q. If you had no other instrument but the wattmeter, the best you could do would be to get a curve-meter to show the power had been taken?

A. You could use a curve-meter to show it.

Q. You could use, for instance, during this morning, this hour, for instance, you would use 100 horse-power, the next hour 300 horse-power, the next hour 600 horse-power, and the wattmeter would merely show the average of the power that you had used?

A. No, it wouldn't show the average. Show all that you used, not the average. Show what was used. [152—84]

Q. It would show you had used so many kilowatts during those hours, would it not?

A. No, if you looked at the recording apparatus you would see from the curves as it appeared on that just what you had drawn at any instant.

Q. I understand, but getting away from the curve reading wattmeter, an ordinary wattmeter wouldn't show you anything of that kind?

A. But it would show you what they are using at any instant.

Q. But it would show in the allowed time that you examined the wattmeter. You can't always stand and look at the meter, can you Mr. Thane?

A. No, can't always stand there.

(Testimony of B. L. Thane.)

Q. When you examined the wattmeter would only show that part of the actual number of kilowatts taken between the time of the two readings, is that not true?     A. An ordinary wattmeter?

Q. Yes.

A. No; an ordinary wattmeter doesn't record—if you set an intergrading wattmeter that would record the power you had used from time to time and you could look at it and it would tell you where more than the peak had been used.

Q. When you use a curve line wattmeter the curve reading shows how big a peak above a certain fixed line had been used at any one time and how much below it?     A. Yes.

Q. But there is nothing there to prevent the consumers from going above it?

A. Not in just the wattmeter.

Q. Now the only method, therefore, is by installing a circuit-breaker, is that not true?     [153—85]

A. Quite right.

Q. Now, in starting machinery, Mr. Thane, what you choose to call a starting surge and we call a starting current is an increased flow of amperage?

A. Yes.

Q. At the same voltage, assuming the voltage to remain the same?

A. Well, the only reason your voltage is the same is because you have a Terro regulator on your machine which keeps the voltage up; otherwise the voltage would drop down so the multiplication by the two times the power factor would give you what

(Testimony of B. L. Thane.)

actual power you used at that instant.

Q. I know, but it requires more power to start a machine than it does to keep it running?

A. Instantly just to start it.

Q. For the start, for the time being, whether for one minute or for one second, or for whatever it is, it requires a large quantity of power to start machinery, does it not?

A. Yes, it wouldn't make—for instance, if you were looking at the indicators, that would go up like that, but as a matter of fact that actual power wouldn't be used for the reason that the indicator has an impetus from the sudden rush of current, the flip of current over it. If you took the top notch that might apparently seem as though you used a whole lot of power to start it, but the best way to show that you are not using a whole lot of power is that you could use a 300 horse-power generator by itself alone which would start it or be able itself at any time to start our—

Q. Now, but you don't want to deny you require an excess of power to start the machinery for a moment? [154—86]

A. Just for an instant.

Q. For a short time?

A. Just for an instant.

Q. If your machinery consumes 300 horse-power, it requires more than 300 horse-power to start it, does it not Mr. Thane?

A. No, it does not.

Q. It does not?

A. No, you can start it with 300 horse-power.

(Testimony of B. L. Thane.)

Q. Then it does not require, Mr. Thane, any more horse-power to start machinery than it does to keep it running?

A. No, you see the way you start it, you always start it without the load and you start slowly. For instance, you take an ordinary engine of 300 horse-power it certainly will start the machinery that it runs. Take a sawmill with a 300 horse-power engine where it requires 300 horse-power to do the sawing, it will start the machinery and run it, start the line first.

Q. You know, Mr. Thane, the resistance offered by machinery standing still? A. Yes.

Q. It is very great and requires momentarily a tremendous amount of power, you know that as an engineer?

A. Yes, but here are the conditions, you don't start these motors on that line against the full load. You always take the load off. What actually occurs the motor is running a compressor, the compressor is then loaded. In our case the compressor was unloaded, not pressure against it at all. All in the world that motor has to do is to turn itself, start itself and start that compressor, just turning over, that is all. [155—87]

Q. Now, you wish now to testify, Mr. Thane, that if you got 300 horse-power at Sheep Creek—

A. Yes.

Q. —you could operate your machinery and start your machinery required, with 300 horse-power?

A. If I had an independent plant and no other



(Testimony of B. L. Thane.)

uses, you understand, at all; an independent generator of 300 horse-power with a pipe-line, for instance, that went against the water-wheel, that ran that generator, and a pipe-line designed to carry no more than 300 horse-power, that would start all our machinery and run it up to 300 horse-power.

Q. If a power plant were especially installed for your use you mean?

A. That is just an illustration, yes.

Q. But I am talking about the power plant as it exists, not one especially installed for your use, but a large power plant from which you were drawing—

A. Yes.

Q. Say you have 300 horse-power furnished you at the power plant for use in operating machinery, can you start your machinery without drawing from the power plant an excess of load, a larger quantity of horse-power than 300 horse-power, that is what I mean?

A. I think we could, Mr. Hellenthal, providing we went to work and put in a lot of special apparatus for that purpose.

Q. Special apparatus for that purpose?

A. Special apparatus for that purpose, above the ordinary.

Q. And that apparatus is obtainable and you could put that there if you wished to?

A. I think we could, yes. Have to put in special apparatus. [156—88]

Q. You have not that apparatus now, Mr. Thane?

A. We have no special apparatus. Just have the

(Testimony of B. L. Thane.)

ordinary practice.

Q. The ordinary machinery such as others are using?

A. Such as they use at Treadwell exactly.

Q. Just as they are using at Treadwell?

A. The same types.

Q. With the machinery you now have installed in order to start out, hook on the 300 horse-power, do you require more than 300 horse-power to start with?

A. I suppose for an instant we do. I don't know just what it would figure. It would be so instantaneous, I don't know as you could figure that exactly. I personally don't think it takes 300 horse-power to start that. Think it is just the sudden rush of current is my own opinion.

Q. It has the effect, however, of throwing out that circuit-breaker?

A. Yes, because the circuit-breaker is set at unity power factor with 56 amperes, just registers current, not horse-power, and just the second that current rushes through there quicker than that (indicating), out it goes before you can get a start; but I don't believe personally that the actual power it takes to turn over that machinery is 300 horse-power if you could get right down and measure it. It would be difficult to measure it with that ammeter and wattmeter for the instant that they start that swings the current over and back under, quick as lightning. Might probably run over the 300, but I don't think that it does personally.

Q. You would not then be complaining then, Mr.

(Testimony of B. L. Thane.)

Thane,—you don't want any more than that? [157—89]

A. We don't want any more than 300 horse-power and a chance to start our machinery.

Q. When you say a chance to start your machinery?

A. All we want is a chance to start our machinery.

Q. When you say a chance to start your machinery, do you mean more than 300 horse-power?

A. Just enough to start our machinery, whatever it is.

Q. If it takes more than 300 horse-power, is that what you mean to say?

A. Yes, we want to start our 200 horse-power motor. It is only 200.

Q. I understand, yes, but we are figuring now on the basis of 300. A. Yes, I see.

Q. If it requires more than 300 horse-power to start your machinery, you are figuring you ought to have it?

A. Yes, under the contract ought to be given a chance to start our ordinary machinery.

Q. In the case of the construction of an electrical contract, Mr. Thane, that specifically reads "An electric current not to exceed 300 horse-power," you think that you would be entitled to more than 300 horse-power?

A. You don't want—you forget it is not interrupted.

Q. When the contract expressly says "An electrical current not to exceed 300 horse-power," I am as-

(Testimony of B. L. Thane.)

suming such a contract to exist.      A. Yes.

Q. Do you still, notwithstanding the wording of that contract, as an electrical engineer, say that the consumer would be entitled to more than 300 horse-power at any time?      A. Yes, sir. [158—90]

Mr. SHACKLEFORD.—Just a moment. I don't know just how far the Court wants to go into this. It seems to me that Mr. Hellenthal is commencing to argue his case now instead of cross-examining the witness. There is no question about what their claim is. It is contained in the complaint. We claim a reasonable starting surge.

The COURT.—I think the witness is being used as an expert in electricity and on that standpoint I think the question is reasonable.

Mr. SHACKLEFORD.—Very well.

A. (By the WITNESS.) Repeat your question, please.

Q. (By Mr. J. HELLENTHAL.) Where a contract, an electric contract, expressly provides, Mr. Thane, for the furnishing of an electrical current not to exceed 300 horse-power, under such a contract you wouldn't say that the consumer would be entitled at any time to a current larger than 300 horse-power, provided, of course, Mr. Thane, that there were no other specifications in the contract?

Mr. SHACKLEFORD.—Just a moment. We object to that question as not based on any hypothesis in the case. No objection to the questions being asked with reference to the contract and its provisions being shown to the witness.

(Testimony of B. L. Thane.)

The COURT.—Objection overruled.

A. (By the WITNESS.) May I answer the question?

The COURT.—If you understand it.

A. Whenever on all the technical points of an electrical contract, as might be defined by an electrician,—where mistakes in a contract I would look to the intent of the party who made the contract and see what they meant when they made the contract.  
[159—91]

Q. (By Mr. J. HELLENTHAL.) Well now, Mr. Thane, leaving the intent of the parties out, supposing you know nothing of the intent of the parties, you are only judging from the contract, pay no attention to what the parties intended, that is still another matter, would you if the contract expressly provides upon its face for the furnishing to a consumer of an electric current not to exceed 300 horse-power, makes no other provision with reference to the furnishing of the power and you had nothing before you as to the intent of the parties outside of the provisions in the contract, you don't know what the parties talked about before the contract was entered into, on such a contract you wouldn't claim that the consumer would be entitled to more than 300 horse-power at any one time, would you Mr. Thane? A. No.

Mr. J. HELLENTHAL.—That is all.

Redirect Examination.

Q. (By Mr. SHACKLEFORD.) Now then, Mr. Thane, starting on that line of assumption, I will ask you this question. If a contract designed to give to



(Testimony of B. L. Thane.)

the use of a party 300 horse-power was before you, what would you say with reference to the fair and usual and proper practice with reference to a starting surge?

A. I would say that it is proper to give them an opportunity to use that 300 horse-power.

Q. Well, if under the conditions established at the generating plant you were compelled to use a starting surge, your answer would be that you are entitled to that starting [160—92] surge?

A. Certainly would be.

Q. If that condition of affairs which denies to you an uninterrupted current exists at the generating plant where the contract provides for an uninterrupted current, what would you say as to the use of a reasonable starting surge?

A. I would say they would have to give it and have to put in a time relay so you could have it.

Q. Without a number of special devices, Mr. Thane, it would be impossible to get the benefit or the use of the 300 horse-power with the conditions in the generating plant of the defendants, wouldn't it?

A. That is correct.

Q. Now, for example, for illustration, I will ask you the question which was asked Mr. Kinzie the other night, when Sheep Creek gets to a stage of water where it is impossible to create more than 300 horse-power on its generators and yet it is possible to create an even 300 horse-power, what condition are you in with reference to starting?

A. They can start us, absolutely without question.

(Testimony of B. L. Thane.)

Q. If the defendants in that case were enabled to arrange in any way, either by separate generator, water-wheel, or in any other way, an uninterrupted current of 300 horse-power, what would be your condition with reference to starting?

A. They could start us.

Q. Now, in the beginning of the examination Mr. Hellenthal has referred to the question of time relay circuit-breakers, and I will ask you where the ordinary circuit-breaker is set without a time relay on it, what arrangement [161—93] is made with reference to that circuit-breaker so that it performs the same functions as a time relay circuit-breaker?

A. Well, for instance if you are running a motor off a main line or distributing line, it is very often the practice, instead of putting in a time relay circuit-breaker, to put an instantaneous circuit-breaker in there; but you set the amperage of that circuit-breaker so that it will allow for the surge in starting, that is all; in other words the amperage is set much higher than the machine actually uses so that it can start and run, that is for individual motors or two or three motors on the line.

Q. Now the particular circuit-breaker used in this case is not only instantaneous, as I understand it, but it is set to the hair on the amperage calculated by the defendant companies?

A. Yes, figured at unity power factor.

Q. I will ask you what the general use of synchronous motors is at the present time with reference to generating plants. Just explain to the Judge

(Testimony of B. L. Thane.)

how it is used and whether the generating plant or the consuming plant is in the habit of placing a synchronous motor there?

A. Your Honor, a synchronous motor just developed in the last two or three years past, has come into use almost entirely in places where the man who is generating or the company who is generating power had a system already installed and where their generator for making the current had become overloaded with current and they wanted to get more use out of its generator. They very often take and bring a synchronous motor, as they call it, float it in on the line even though it isn't running anything, sometimes [162—94] with the idea of bringing the power factor up to unity so that the generator will have greater capacity and then they can put more power on the generator and get more power out of the same machine, that is all.

Q. Now, can such an apparatus for the purpose of synchronizing be established at the Sheep Creek power plant? A. Yes, it could.

Q. Now, there is another question, Mr. Hellenthal has showed you a number of books herewith *refer* to the rating or efficiency of machines and the power factor and to clauses referring to machines that are not rated? A. Yes.

Q. I will ask you if you know what the rating on the generators of the defendant companies is at Sheep Creek?

A. I have been informed from Mr. Pullen and Mr.

(Testimony of B. L. Thane.)

Wallenburg. I never examined them personally, but they both—

Mr. J. HELLENTHAL.—Object to that testimony.

Q. (By Mr. SHACKLEFORD.) Well, if the rating on those generators was 85 per cent and the rating on your motor was 85 per cent at the Perseverance mine would you under that rule have any right to use unity power factor?

A. Why, I don't know. Their generator is figured, I think, at 85 per cent power factor because that is the motor rating of the machines recognized in power factor and the natural conditions of the inductive loads of the machine was designed with 85 per cent power factor, I think it is 85 per cent, that that is the usual rating for all those generators.

Q. But what I mean to say is—the questions by Mr. Hellenthal directed to you were upon a state of facts referring [163—95] to the efficiency of machines that were unrated?

A. Exactly; special conditions.

Q. How many synchronous motors—do you know of any synchronous motors in use in this mining district at the present time?

A. I think, I don't think there are any actually in use.

Q. I understand, Mr. Thane, that your current and machinery in connection therewith are being used in ordinary mining operations?

A. They are.

Mr. SHACKLEFORD.—That is all.



(Testimony of B. L. Thane.)

Recross-examination.

Q. (By Mr. J. HELLENTHAL.) Just a question or two, Mr. Thane. What do you mean by saying that the generator has an 85 per cent power factor?

A. Why, I mean this, that—I have already stated the same thing two or three times—when you say 85 per cent power factor for the generator, their generator is designed so that it won't overheat with a certain generation of current and power and the designer of the machine recognizing ordinary practice and custom has figured on an induction loan of 85 per cent, figuring that is the average induction loan or somewhere near it that would take place.

Q. Take a particular plant to carry, is that what you mean?

A. Could carry that without overheating.

Q. Without overheating. You don't mean to say that a particular plant, the generator plant generates power factors? A. No.

Q. It generates amperes and voltage? [164—96]

A. Generates current.

Q. Amperage and voltage, is that not true?

A. It is built to have a certain power factor.

Q. But it has nothing to do with the amperage and voltage generated, does it? A. Yes.

Q. How does what you call the power factor of the generating plant enter into the power actually existing in the amperage and voltage generated at the generator has nothing to do with it?

A. Yes, affects the capacity of the machine.

Q. Affects the capacity of the machine, but it



(Testimony of B. L. Thane.)

doesn't affect the power, the horse-power actually existing in the amperage and voltage generated, does it? A. Your question doesn't cover it.

Q. Well, answer my question.

A. I am going to try to answer the question.

Q. All right.

A. The voltage of the machine is kept standard or nearly so, so the amperage, meaning the measure of current, would vary and if you had your machine built so—had it built at 85 per cent power factor it would mean that that machine before it overheats would develop so many amperes of current and if you brought that up to unity power factor it would develop still more amperes of current under the same voltage without overheating, provided you put more power on it.

Q. That is the point exactly.

A. It affects it though.

Q. By the power factor of the generator you mean the difference between the commercial capacity given to a power [165—97] plant and the power—than what you actually produced without overheating?

A. No; I mean the current that it would be capable of producing under ordinary loads without overheating, that is what it is designed for.

Q. With relation to the commercial given capacity of the generator?

A. Well, the actual capacity, not the commercial; the actual capacity of the generator.

Q. Now listen, Mr. Thane, the power plant at Sheep Creek, we will say, is rated at a 3,000 horse-

(Testimony of B. L. Thane.)

power plant?      A. Yes.

Q. It actually generates something less than that?

A. Yes.

Q. That is true, isn't it?      A. Yes.

Q. But what it does generate, the horse-power it generates is horse-power just the same, isn't it?

A. Oh, of course.

Q. Why certainly, the voltage and the amperage generated at the generating plant have in them no element of power factor?      A. Oh, yes, they have.

Q. Why?

A. Because the power factor of the circuit drawing the power off of this machine would have a certain power factor which affects the generator. The generator is a part of the system; bound to be affected by it.

Q. I know, but listen now to this question so you understand me, Mr. Thane—I don't think you quite understand me. When a certain amperage impressed with a certain [166—98] voltage passes from the bus-bars upon a wire, upon a system to carry it away somewhere for use, the amperage and voltage taken from the bus-bars represent so many watts being the sum of the two or the product of the two and that is not affected in any wise with the generating capacity of the generating plant, is it?

A. Well, that multiplication you use left out the power factor.

Q. Well, putting in the power factor—the power factor—I am speaking not now of power factor or generator, but the power factor of the motor?

(Testimony of B. L. Thane.)

A. Yes, it would affect the generator—the generator when figured at 85 per cent.

Q. I am not saying whether it would affect the generator. Would the power factor of the generator affect the current itself except to increase or diminish it?

A. Well that affects it. It would in that respect.

Q. Well, it wouldn't affect the horse-power in a given current? A. Yes, it would.

Q. Now, we are taking this case, Mr. Thane—let's see if we understand one another—where we have a generating plant, we will say, of—with a power factor of 85 per cent beside it—a generator with a power factor of 78 per cent as of those—

Mr. SHACKLEFORD.—Generating plants?

Q. (By Mr. J. HELLENTHAL.) Well, generating power. A. Yes.

Q. We draw from one generating plant or we draw from each generating plant at a voltage we will say of 2,500 or whatever it is, 2,000, the amperage and voltage drawn in [167—99] each instance being the same, you see—now, the power factors of the generating plants being different, you understand now, is it not a fact that the current drawn from one generating plant has exactly the same horse-power that the current drawn from the other generating plant has? A. That the current—

Q. Yes. A. Your terms are a little confused.

Q. Let's get it straight so we will understand it; that is the easiest way to get it you understand. You assume here a generating plant that has what we call

(Testimony of B. L. Thane.)

a power factor of 85 per cent and right immediately beside it is a generating plant with a power factor of 75 per cent you see?     A. Yes.

Q. The power factors in the two generating plants being different. Now both of these generating plants are working—     A. Yes.

Q. We draw from the bus-bars of the two plants two currents, one from each plant, the current drawn from each plant has a flow of 100 amperes impressed with a voltage of 2,000, you see?     A. Yes.

Q. The amperes and voltage in each case being the same you see?     A. Yes.

Q. Is it not a fact that the horse-power contained in each one of these two currents is exactly the same?

A. No; it would depend upon the power factor.  
[168—100]

Q. The power factor in the generating plant?

A. Well, yes, so long as your generator is in your system.

Q. Wait a minute; let me understand.

A. I think I do understand.

Q. The power factor in each one of these cases is the same, you understand, the power factor of the motors?

A. I think I understand what you are driving at with your questions.

Q. All right; now answer.

A. Well, you are trying to see, aren't you, what the effect of this 85 per cent power factor that is rated on the machine has to do with the whole system?

Q. No.

(Testimony of B. L. Thane.)

A. Isn't that what you were trying to show?

Q. No. That ain't what I am trying to show. I am trying to show what that effect of 85 per cent power factor of the generator has to do with the current actually produced.

A. That is what I am talking about.

Q. If you— A. I understand.

Q. Is this not a fact, let's get at it this way—see if we understand one another—that the 85 per cent power factor in the generator deals entirely with the producing power of the generator, that is to say?

A. It is the rating that the generator has before it would commence to overheat.

Q. Yes, that is to say— A. And it is also—

Q. If more than 85 per cent of the produced power of the generator is produced, you say the generator is liable to overheat; isn't that what it means?  
[169—101]

A. No; if the power factor would be less than that, why the capacity of the machine would not be quite so great, that is what it would mean. The fact of it being rated 85 per cent power factor, as a matter of fact, Mr. Hellenthal, is a recognition on the part of the makers of the power factor existing in the average load and they take one of 85 per cent and they build their machine so that it will be built expecting a power factor of that percentage, you see, that is why they do that. Now, if you changed your—if your system would change this power factor so it was 70 or 60 per cent instead of 85, your machine would not have quite the capacity that it would if your



(Testimony of B. L. Thane.)

whole power factor was 85 per cent. Do you see, they just assume that point of 85 as a sort of average and use that as a rating there at that point.

Q. If you get more then out of it you are apt to heat your machine?

A. No; if your power factor is less than that your machine would not have as great a capacity. At that point the machine has the normal capacity for which they built the machine for.

Q. That is to say, your machine is supposed to have the capacity indicated—multiplied by the horse-power?

A. To get the horse-power that the machine was designed for you would figure on a 85 per cent power factor in your line and it is a good example of the recognition on the part of the makers of the average load having a power factor.

Q. It has nothing to do with the fact that the generating plant would overheat if forced to generate its entire [170—102] capacity or anything of that kind?

A. Yes; it is the point at which the machine reaches the condition on which it was sold. It was sold not to overheat when there was 85 per cent power factor on the line and it is developing so many horse-power, that is what it is sold to you for and they rated it at 85 per cent power factor for that reason.

Q. Well now, that has to do entirely with the capacity of the generating plant, has it not, Mr. Thane?

A. Yes.

Q. And has nothing to do with the horse-power in-

(Testimony of B. L. Thane.)

herent in the amperage and voltage produced, does it? A. Well, it has, yes. .

Q. A watt produced by one generating plant contains exactly the same power that a watt contains produced by another generating plant, regardless of what the power factor in the two plants may be, does it not? A. Yes.

Q. Is that not true?

A. Yes, provided you considered power factor that is true.

Q. A watt, that is the unit of electricity?

A. Yes.

Q. One watt contains exactly the same amount of power as another, does it not?

A. Yes, multiplied by its power factor under a given condition.

Q. Well, a watt is a watt, isn't it?

A. Yes, a watt is a watt.

Q. And doesn't one watt contain the same power factor that another does? A. No. [171—103]

Q. It doesn't? A. It doesn't.

Q. I say the same power factor. I don't mean that, Mr. Thane. I mean the same quantity of power as a unit of electricity? A. It does.

Q. Why, certainly, and that is so regardless of power factor that may exist in the generating plant that produces the watt; is that not true?

A. No, the power factor is a part of your watt. A watt is the same under all conditions, but if your power factor is different the amperage is different.

Q. But it requires a certain number of amperes to

(Testimony of B. L. Thane.)

make a watt?      A. Multiplied by this power factor.

Q. Well, I understand, assuming the power factor of the motor to be unity?      A. Yes.

Q. But the power factor of the generating plant, the power factors of the different generating plants would be different. If one generating plant has produced a watt—      A. Yes.

Q. The generating plants having different power factors, the watts having—

A. Would be the same.

Q. —being used for the same purpose?

A. They would be the same.

Q. They would be the same and that is all there is about that subject. Now, Mr. Thane, there is another question I forgot to ask you about a little while ago. You don't intend to operate all these mines that you are talking [172—104] about with this 300 horse-power?      A. No, sir.

Q. Never did so intend?      A. No.

Q. You intended to have your Salmon Creek plant ready by November, didn't you?

A. Didn't think we could get it ready by November; in fact knew we couldn't.

Q. That was your original plans?

A. My original plan was to push it as hard as I could push it, and that is exactly what we are doing; working night and day right now.

Q. You expected to have it by November?

A. No, sir.

Q. When did you expect to have it ready?

A. Just as soon as it was finished. A good many

(Testimony of B. L. Thane.)

factors that come into those things.

Q. I am not finding fault with you for not having the Salmon Creek plant ready.

A. I wish it was ready just as much as you. I had counted on the 300 horse-power and need it too and I need the power and I counted on it all the way through.

Q. You continue to count on the 300 horse-power?

A. Yes, we do.

Q. Even if the Salmon Creek plant is ready?

A. If an opportunity to use it is given.

Q. When will your Salmon Creek plant be ready?

A. I can't say.

Q. Have you any idea?

A. I hope to get it ready in a month or six weeks.

Q. In a month or six weeks? [173—105]

A. If can get in that unit are going to do it.

Q. How much power will the Salmon Creek plant give you?

A. About five or six hundred horse-power.

Q. Five or six hundred horse-power?

Mr. SHACKLEFORD.—I don't know what the purpose of counsel is, but it seems to me that he has gone into it far enough so far as this case is concerned.

Mr. J. HELLENTHAL.—Merely to show that all these disastrous effects if they don't get their 300 horse-power will be overcome at the time the Salmon Creek power comes in.

Mr. SHACKLEFORD.—Not cross-examination.

The COURT.—Objection sustained. I think he

has already answered that question.

Mr. J. HELLENTHAL.—That is all.

Witness excused. [174—106]

**[Testimony of W. S. Pullen, for Defendants.]**

W. S. PULLEN, being called and duly sworn, testified as follows in behalf of the defendant:

**Direct Examination.**

Q. (By Mr. SHACKLEFORD.) Mr. Pullen, just state your name and occupation.

A. Name, Winfield S. Pullen; occupation, electrician; living in Juneau, Alaska.

Q. Mr. Pullen, have you been in charge of the—in active charge of the plant of the plaintiff company in this case and their lines?

A. Yes, sir, since June the eleventh.

Q. June the eleventh?

A. Yes, sir; construction and operating.

Q. You remember about what time you started to build the feeder line of the plaintiff company so as to make the connection between the Perseverance and the—

A. Sheep Creek end?

Q. —Sheep Creek end?

A. I think that was the latter part of July.

Q. You have been in the power-house of the defendant companies?

A. Yes, sir, several times.

Q. I will ask you to state, Mr. Pullen, what method of power measurements is used by the defendant companies upon their own lines exclusive of the line in controversy?

A. I think a wattmeter.

Mr. J. HELLENTHAL.—That is immaterial, your Honor.



(Testimony of W. S. Pullen.)

The COURT.—Objection overruled. [175—107]

Q. (By Mr. SHACKLEFORD.) What sort of meter is set upon the line of the plaintiff company?

A. They have simply an ammeter on the panel and an oiled switch—a circuit-breaker.

Q. Is that—

Q. (By the COURT.) What sort of switch?

A. This is a circuit-breaker—an oil switch.

Q. Oiled? A. Oiled switch and ammeter.

Q. (By Mr. SHACKLEFORD.) How does it operate, by time or instantaneous?

A. Well, it is supposed to operate and is operated instantaneously so far as we can judge.

Q. What sort of circuit-breaker is used by the defendant companies in connection on the lines feeding their own plant?

A. Well, they use an oiled switch connected with a relay circuit-breaker—in connection with a relay.

Q. How long, Mr. Pullen, have you been an electrician? A. About seventeen years.

Q. Seventeen years? A. Yes, sir.

Q. You were with the city lighting plant here before you— A. Yes, sir.

Q. —went with the plaintiff? A. Yes, sir.

Q. Assuming that there was given to us, that is to the plaintiff company, an uninterrupted current of three hundred horse-power, what would you say with reference to the starting capacity of such a current [176—108] upon the plant of the plaintiff company as it now exists at the Perseverance mine?

A. Well, I could run the plant easily—we could

(Testimony of W. S. Pullen.)

run a two hundred horse-power motor without any trouble.

Q. Assuming that the Sheep Creek power plant was reduced in its flow of water so it could only produce three hundred horse-power and no more, what would you say with reference to starting the machinery at the Perseverance mine?

A. We would not have any trouble.

Q. To what extent would you say you could start machinery, that is what the machinery in the Perseverance mine is—of about what horse-power?

A. Well, it is—it is built for one hundred and seventy-five to two hundred, depending on the line voltage—amperage on the motor.

Q. You would be able to start nearly three hundred—a machine of nearly three hundred horse-power—with the water in Sheep Creek producing only three hundred?     A. We could, yes, sir.

Mr. J. HELLENTHAL.—Your Honor, that is immaterial; the water is not producing three hundred, it is very much less.

The COURT.—I don't think it makes any difference with this question, just showing the starting power of three hundred horse-power. [177—109]

Q. (By Mr. SHACKLEFORD.) Now, then, Mr. Pullen, under ordinary circumstances, with a circuit-breaker, an instantaneous circuit-breaker, with as is set by the defendant companies upon the line of the plaintiff company or with the power plant sometimes operating—with a power, frequently operating with a power above three hundred horse-power,—could

(Testimony of W. S. Pullen.)

you under those circumstances obtain the use or benefit of three hundred horse-power?

A. Well, the way the circuit-breaker is set now I could use our motor if they would allow us to start it up, but I can't start that motor with the circuit-breaker set at fifty-six amperes; that is impossible.

Q. It is impossible to get the benefit or enjoyment or the use of three hundred horse-power under those conditions? A. That is the idea.

Q. That is all. Just a moment—probably want to cross-examine you. O, yes, there is another question, Mr. Pullen. It has been stated in the courtroom several times to-day that when—I will withdraw that question—in the first place, what is the proper method of measuring horse-power?

A. By using a wattmeter.

Q. Do you know of any other recognized, of measuring actual power in delivery?

A. I do not; no, sir.

Q. With reference to starting this plant, will you [178—110] tell the Court first about the starting of this plant from the gas plant some days ago, the amount of power used and the result of that experiment?

A. Well, we have a gas engine, Judge, that drives a 200 kilowatt generator; the gas engine at best has never developed more than 225 horse-power, and we have been able to start this motor that is mentioned here that day with that machine without any trouble.

Q. How long were you able to run it?

A. Well, running under full load, run about an

(Testimony of W. S. Pullen.)

hour and a half when the engine wouldn't stand it and laid down.

Q. The gas engine wouldn't stand it?

A. The gas engine wouldn't stand it.

Q. Now, I will ask you what you have to say with reference to the claim that it takes 900 horse-power to start this Perseverance current?

A. Well, I know that is a mistake.

Q. —or machinery? A. Absolutely a mistake.

Q. I wish you would describe to the Court the approximate duration of this so-called starting surge?

A. Whenever we start the motor at the Perseverance, Judge, the needle on the—

Mr. J. HELLENTHAL.—Just a little louder.

A. —whenever we start this motor at the Perseverance the needle located on our ammeter located on our Sheep Creek board surges up to about one hundred and fifty and drops back to [179—111] normal inside of ten seconds. I have seen it start up at the Treadwell plant—I could start up on a gas engine in about twenty seconds on just about the same surge, as near as I could measure it.

Q. (By Mr. SHACKLEFORD.) Now, I wish you would tell a little more particularly how long that needle stands at the extreme limit and how the drop comes?

A. Well, in the first instance, it will surge up to a hundred and fifty, then inside of half a second she will drop back to about seventy-five, as near as you can judge, and then inside the next eleven or twelve seconds she will be back to normal, which in that case

(Testimony of W. S. Pullen.)

would be about thirty amperes, that accounts for the current since in the current the line losses also the transformer losses appear.

Q. (By the COURT.) You mean you get thirty out of fifty-six? A. Yes, sir.

Mr. SHACKLEFORD.—That is all. [180—112]

Cross-examination.

Q. (By Mr. J. HELLENTHAL.) How long, Mr. Pullen, did you say you had been engaged as electrical engineer?

A. I never said I was engaged as electrical engineer; I said I had been in the electrical business for seventeen years.

Q. You have had no special training as electrical engineer?

A. No, I have had ordinary school education. I am not a graduate of any college.

Q. You are not a graduate of any college?

A. I went but never graduated.

Q. Well, your experience is based merely upon your knowledge of electricity—is based merely upon your experience? A. Yes, sir.

Q. In working with electricity? A. Yes, sir.

Q. In various capacities? A. Yes, sir.

Q. As a line man and as— A. In all capacities.

Q. And as electrician in all capacities?

A. Yes, sir.

Q. And that experience covers a period of seventeen years? A. Yes, sir.

Q. Where has that experience been, Mr. Pullen?

A. Well, eight years in Juneau, and I was four



(Testimony of W. S. Pullen.)

years [181—113] in Boston.

Q. For eight years in Juneau you were connected with the electric light plant, in Juneau?

A. Yes, sir.

Q. What was the balance of it?

A. Four years' work in the city of Boston.

Q. What were you doing there?

A. I was electrician with a construction company handling everything from a push button to a complete heating, light and power-plant—general electrical contractors.

Q. You were with them for four years?

A. Yes, sir.

Q. What work—what special work did you do with them, Mr. Pullen?

A. Well, my specialty at that time was fireproof construction, that is, wiring and equipping fireproof—wiring and equipping fireproof stores, office buildings, anything.

Q. Wiring buildings so they would be fireproof?

A. Yes, sir.

Q. That was your business for four years when you were with the Boston concern? A. Yes, sir.

Q. What other experience have you had?

A. Well, I was with the J. N. V. Lane Construction Company, at Bangor, Maine, as construction foreman.

Q. How long with those people?

A. Nearly three years. [182—114]

Q. What was your specialty in connection with that employment?

(Testimony of W. S. Pullen.)

A. I had direct charge of all their out of town construction; they were general electrical contractors.

Q. What did you furnish—electric lights?

A. Yes, sir, anything electrical.

Q. The same as the Juneau electric lighting plant, on the same—

A. O, no, the Lane Company was a general contractor. He handled goods, anything in an electrical line throughout the country.

Q. Installation of electrical apparatus?

A. Yes, sir, that is the idea.

Q. You installed electric lighting plants and things of that kind? A. I did.

Q. You were with them for three years?

A. For nearly three years.

Q. Now, Mr. Pullen, your plant at the Perseverance operated successfully up to the twenty-fifth of December, did it not? A. Yes, sir.

Q. The circuit-breaker at Sheep Creek was then placed exactly as it is now, was it not?

A. No, sir, I understand not, otherwise never been able to start that motor.

Q. You understand. If it was standing on the twenty-fourth or the twentieth of December just as it now stands, you have been misinformed?

A. Yes, sir. [183—115]

Q. Is that true? A. Yes, sir.

Q. Now, about your starting surge, by a starting surge, Mr. Pullen, you mean an increased flow of electricity, isn't that it?

A. That is about the idea. Yes, that is all within a moment.

(Testimony of W. S. Pullen.)

Q. Sometimes called a peak?

A. Yes, sir, sometimes called a peak, most always called a surge though.

Q. You call a surge?

A. There is quite a difference between a surge and a peak.

Q. What is the difference between a surge and a peak?

A. Well, they usually speak of a peak as a peak load, that is the highest point or load in a power-house that would register during the day.

Q. That is the peak?

A. That is the average during twenty-four hours.

Q. That is the peak load for the twenty-four hours?     A. Yes, sir.

Q. That is you say it is the highest amount of power drawn during the twenty-four hours?

A. That is the idea.

Q. The word "peak" originated with the curve reading meter?     A. Highest point.

Q. So the curve reading meter showing the line up and down, wave up and down as the current is drawn?

A. Yes, sir. [184—116]

Q. The uppermost points are the peaks?

A. That is the idea.

Q. That is what you referred to as a peak, is it not?

A. Yes.

Q. That is you say the highest quantity?

A. The highest point would be the peak, yes.

Q. And what you draw when you start is an increased quantity of amperage and voltage?

(Testimony of W. S. Pullen.)

A. No, might be an increase in amperage for a short time but the voltage, unless it were artificially kept up, would drop.

Q. Well, where a voltage is constant, as it is at Sheep Creek, there would be an increase in amperage?

A. Yes, there would be for a short time.

Q. For a short time? A. Instantaneous.

Q. A machine that draws—that requires three hundred horse-power to operate when it is loaded would require for a short time when it is starting a quantity of power in excess of three hundred horse-power?

A. We haven't any machine that requires three hundred horse-power to operate.

Q. I know, but a machine that does—if you had such a machine—a machine that would require three hundred horse-power would require a peak to start it, would it not?

A. Yes, but a machine that would require a three hundred horse-power to operate don't necessarily mean that it would take that—three hundred horse-power to start it up. Always start it under no load [185—117] and light.

Q. Well, I am talking if you—of course, if you do not increase your—if you make your—take your load off your machine, why you don't require over the three hundred horse-power, if the machine is a three hundred horse-power, you would require no starting surge or peak?

A. Oh, yes; it takes a little surge. I could start up a machine that takes three hundred horse-power to

(Testimony of W. S. Pullen.)

operate with a fifty horse-power motor but I could not run that machine under load, that is, start it up light—no load on it.

Q. Then, if you were getting at Sheep Creek off the bus-bars there three hundred horse-power and your machines required three hundred horse-power to operate, you could start, couldn't you, Mr. Pullen?

A. Oh, yes; could start all right.

Q. And an instantaneous circuit-breaker would not interfere with your starting?

A. Well, if that circuit-breaker was set so we could start—if we can use the three hundred after we get up the speed.

Q. If the circuit-breaker permitted you to take no more than three hundred horse-power could you start?

A. Well, if I got, if we had a connection with that circuit-breaker, had a time relay which was set to allow for these little starting surges.

Q. I am speaking of an instantaneous circuit-breaker?

Mr. SHACKLEFORD.—If the Court please, I would like to [186—118] have the witness finish his answers to the questions.

Q. (By Mr. J. HELLENTHAL.) Where the circuit-breaker is instantaneous, Mr. Pullen, and is set at three hundred horse-power could you start the three hundred horse-power machine?

A. Yes, sir, we could.

Q. You could? A. We could.

Q. Nothing to interfere with your starting?



(Testimony of W. S. Pullen.)

A. We could start a three hundred horse-power machine with a fifty horse-power motor, that is running with no load, but we could not get that up to load.

Q. The only reason then, Mr. Pullen, you are not starting your machine, if you are getting your required horse-power, is because you are not taking the precaution to take off the load?

A. O, yes, always have started up the machine without the load. It is impossible to start it up loaded; it cannot be done.

Q. It cannot be done? A. No, sir.

Q. Well, you take the load off of it?

A. We certainly do, yes, sir.

Q. What is the—what kind of motors have you got up here?

A. We have a form K induction motor.

Q. What horse-power?

A. Well, it is rated at a hundred and seventy-five and two hundred.

Q. How much horse-power does that form K motor require to start? [187—119]

A. Well, I could start up that motor—I could start up that air-compressor with the twenty-five horse-power motor but I could not run it—give it the initial kick to get it rolling over—I could start that machine up by hand.

Q. You could start it up by hand?

A. I could give it the initial kick by hand.

Q. Then you don't need a starting surge?

(Testimony of W. S. Pullen.)

A. O, yes, we need the starting surge; we could not—

Q. Why don't you go down and turn it over by hand instead of relying on your starting surge?

Q. We have always helped that motor whenever we started up by anywheres from six to eight men on the belt, but they cut down that starting surge to a certain extent. We tried every way we knew how to start this motor without knocking out that circuit-breaker, without success; that is some of the things we tried.

Q. Notwithstanding that, I want you to tell me—just be cautious and careful in your answers so you will be all right and not get confused—how much horse-power does it require to start your motor, your form K motor at the Perseverance?

A. Well, we have started that motor up by using this gas engine which never at any time developed over two hundred and twenty-five horse-power.

Q. And you can start it with that?

A. Yes, sir, we have several times.

Q. Then, Mr. Pullen, if you get three hundred horse-power at Sheep Creek, transmit it to the Perseverance, assuming that you are actually getting three [188—120] hundred horse-power at Sheep Creek—

A. Yes, sir.

Q. —and transfer it to the Perseverance and are unable to start your motor it is due to the fact that your line and transformer losses is more than seventy-five horse-power, is that not it?

A. No, sir, our transformer and line losses will not

(Testimony of W. S. Pullen.)

equal seventy-five horse-power. It is less.

Q. If your line and transformer losses are less than seventy-five horse-power and your motor can start with two hundred and twenty-five horse-power and you are getting three hundred horse-power at Sheep Creek, you have enough power to start your motor, do you not?

A. If we had three hundred horse-power at Sheep Creek uninterrupted we could start that motor at any time we felt like it.

Q. The fact it is uninterrupted would not interfere with your starting?

A. No, but it interferes a little bit in the running of it.

Q. I am talking about the starting now?

A. You can't run it unless you get it started, can you?

Q. If you have three hundred horse-power at Sheep Creek and your line loss is less than seventy-five horse-power—line and transformer losses—

A. Yes.

Q. —you can start your motor at the Perseverance, can you not?      A. Certainly.

Q. What?

A. Certainly, we have already done that.  
[189—121]

Q. Then if you got three hundred horse-power at Sheep Creek and can't start your motor at the Perseverance it would be due to the fact that your line and transformer losses is more than seventy-five horse-power?      A. No, sir.

(Testimony of W. S. Pullen.)

Q. Where else does the seventy-five horse-power go?

A. We do not get three hundred horse-power.

Q. I said, assuming you did?

A. Well, if we did we could start it, that would be all there was to it.

Q. That would be all there was to it?

A. Yes, sir.

Q. Why don't you use your gas plant in starting that motor? A. How is that?

Q. Why don't you use your gas plant in starting that motor?

A. Well, using the gas plant line now is another proposition.

Q. You are using part of the juice you are taking from the bus-bars at Sheep Creek in lighting, are you not, Mr. Pullen? A. At Sheep Creek?

Q. Yes. A. No, not at Sheep Creek.

Q. Aren't you using any power you get from the Treadwell Company for lighting purposes?

A. At Sheep Creek?

Q. Anywhere.

A. O, yes, for lights at the Perseverance.

[190—122]

Q. For lights at the Perseverance?

A. Yes, sir.

Q. How much are you using for lights?

A. Well, I should judge we average about thirty horse-power.

Q. How much? A. About thirty.

Q. Thirty horse-power? A. Yes, sir.

(Testimony of W. S. Pullen.)

Q. Have you tried to turn your lights out and then start your motor?

A. Yes, sir, did that every time started the motor.

Q. Turned them out? A. Yes, sir.

Q. What purposes are you using your gas plant for?

A. We run the Sheep Creek compressor with the gas plant and all the lights at Sheep Creek at present at the beach and at the portal camp.

Q. Wouldn't it be practicable for you, Mr. Pullen to get a starting surge or peak from your Sheep Creek plant—from your gas plant—shut out your Sheep Creek lights for a moment and your Sheep Creek compressor to start your machinery?

A. You mean to start the motor at the Perseverance?

Q. Yes.

A. O, yes, we have done that several times.

Q. Why didn't you do that the other day?

A. Well we could start the motor up but, as I say, the engine won't carry the load, otherwise we would not be here.

Q. I know, but after it is started, Mr. Pullen, you [191—123] have sufficient power to operate, haven't you?

A. For a short time. A very short time. The engine is overloaded and quits.

Q. When did your load quit because you didn't have power enough?

A. You mean when running on the gas plant?

Q. No, when you are running on the Sheep Creek power plant.



(Testimony of W. S. Pullen.)

A. You mean the Sheep Creek power plant of the Treadwell Company?

Q. Yes.

A. Well, the last time it quit was a quarter after two this morning.

Q. That was due to a short circuit over there.

A. No, no short circuit on our line.

Q. Short circuit on the Treadwell line?

A. Yes, I understand a short circuit on their line.

Q. Not due to the fact that they were not furnishing power. They could not avoid it?

A. Yes, due, as I understand, to a short circuit.

Q. Well, I am speaking aside from the accident—when was it your plant has shut down because of insufficient power?

A. Well, let's see, I think it was about—about a week ago—a week ago last Monday night we were up here before the Judge and we started up the motor the next day I think; it run about a day and then stopped.

Q. What caused it to stop?

A. Well, our own circuit-breaker at the Perseverance mine failed to work, that was from an overload on our air-compressor. [192—124]

Q. It was your own air-compressor?

A. It was at that time.

Q. Wasn't due to any slackening of the current at Sheep Creek? A. No, not to my knowledge.

Q. Isn't it a fact that your plant never did stop because of a lack of current furnished you from the Sheep Creek power plant?

(Testimony of W. S. Pullen.)

A. Well, we have always been very careful not to use over that fifty-six amperes.

Q. Well, it never stopped, did it?

A. Yes, I think it stopped once or twice—I can't remember the dates, but I think so.

Q. Well, tell us the circumstances so we can check you up on it.

A. Well, we were working the air-compressor on this motor and used the juice at the time, then the motor would stop.

Q. When was that?

A. Oh, that has happened—oh, I guess a couple of times.

Q. When?      A. In the last month.

Q. In the last month your motor stopped—were you using your power for any other purpose then?

A. No, we were using it for lights, that is all—lights and this motor.

Q. And your motor stopped for no reason except that you were not getting power enough—that happened last month—is that the way you want to testify?

A. Well, I think—I won't say that it was—about the [193—125] last of November or thereabouts. I can't remember the dates as it occurred.

Q. It did happen then last November?      A. Yes.

Q. How often?

A. Oh, I should say about a couple of times.

Q. A couple of times?      A. Yes, sir.

Q. How did you get started again, Mr. Pullen?

A. Well, we didn't have any trouble starting up

(Testimony of W. S. Pullen.)

before Christmas—started in the ordinary way.

Q. Didn't have any trouble?      A. No.

Q. The current was sufficient to start you?

A. O, yes, got along very nicely.

Q. And then when you started again you ran again?      A. O, yes.

Q. Notwithstanding the fact that would stop your machinery because it was insufficient?

A. That is the idea.

Q. How do you account for that, Mr. Pullen?

A. I don't account for it.

Q. Must be something the matter with your machinery, don't you think?

A. No, sir, if anything wrong with that machine we would know it.

Q. If the machine will start, it requires more to start it than to operate it, doesn't it?

A. Well, yes, it—they don't start very easily.

Q. Well, it requires more to start it than it does to operate it, and you can start it nicely with a given current and it stops when operated on the same current? [194—126]

A. Well, sometimes might get a short circuit on the line—might get a break in the line—a break in one of the fuses—blow out the fuse—circuit-breaker fuse or some of those things.

Q. Some of those things probably caused the stop you spoke of in November?      A. Yes, probably.

Q. Not due to the fact that the current was decreased at the Sheep Creek power plant?

A. I don't know anything about it.

(Testimony of W. S. Pullen.)

Q. You don't mean to say, then, that your machinery has stoppd because of a decrease in the power furnished at Sheep Creek?

A. I know the circuit-breaker at the Sheep Creek plant isn't as it is now the same as it was before Christmas.

Q. Well, I am not talking about that. Well, I say you know your machinery never stopped because you were furnished with an insufficient amount of current; you know that to be a fact, don't you?

A. Know that to be a fact because we were very careful not to overload that machine.

Q. I know you were careful, but it never did stop on that account?

A. Well, not to my knowledge; no.

Q. You are running now, aren't you?

A. We are; yes, sir.

Q. Is the current cut back on?

A. O, yes, about nine-thirty this morning.

Q. You are running now? A. Yes. [195—127]

Q. The circuit-breaker is still set at fifty-six amperes? A. Approximately so.

Q. And you are operating without any difficulty?

A. Yes, sir.

Q. Well, you could start with the same power that operates this—is that the way you testified a little while ago?

A. If we were given three hundred horse-power we could start that motor any time we felt like it.

Q. Can't you operate your machine with the same

(Testimony of W. S. Pullen.)

motor—start your machine with the same power that you require to operate it?

A. Yes, sir; we can start that machine with considerable less power than it takes to run that machine operating at full load.

Q. Then, Mr. Pullen, why don't you do it?

A. Well, because the circuit-breaker would never stay in—don't get the juice—we are not getting the three hundred horse-power—otherwise we would have had it right along.

Q. Listen—the circuit-breaker stayed in when you were operating, did it not? A. No, sir.

Q. Why didn't it stay in while you were operating? A. Because they wouldn't hold it in.

Q. It would not go out unless you drew more power, would it? [196—128]

A. Well, we were drawing a little amperage at the time.

Q. You were drawing more power?

A. We were drawing enough to throw it out, yes.

Q. You were drawing more power than you did when you operated, didn't you? A. Yes, we did.

Q. You told me a moment ago you could start with the same power that would require to operate.

A. Yes, if give me three hundred horse-power uninterrupted current.

Mr. SHACKLEFORD.—Now, get that out of your mind. I think the witness ought to be treated fairly.

Q. (By Mr. J. HELLENTHAL.) I will ask the question—you told me a moment ago that you could start your machine? A. Yes, sir.



(Testimony of W. S. Pullen.)

Q. —your motor with the same quantity that required to operate, did you not?

A. I think so; if we could have an uninterrupted current of three hundred horse-power.

Q. Well, I am asking you—you told me that you could start the machine with the same—without increasing the power—with the same amount of power required to operate?

A. I could start that machine with the gas engine which never developed over two hundred and twenty-five horse-power. [197—129]

The COURT.—If you will just answer the attorney's questions, pay attention to them and answer the best you can we will get along faster.

Q. (By Mr. J. HELLENTHAL.) You told me a moment ago you could start that motor with the same quantity of horse-power that required to operate?

A. I could start that motor with less power than it takes to operate it if we could have an uninterrupted current than required to operate.

Q. Will less current than required to operate if uninterrupted? A. Yes, sir.

Q. You could operate and did operate with a circuit-breaker at fifty-six amperes, did you not?

A. Yes, sir.

Q. Is that not true? A. Yes, sir.

Q. In fact, you never shut down because the flow of current was not enough for you to operate on?

A. Not to my knowledge, no.

Q. Then, ultimately, when you attempted to start

(Testimony of W. S. Pullen.)

you used more than fifty-six amperes, which is evidenced by the fact that the circuit-breaker went out?

A. Well, I suppose that circuit-breaker was set at fifty-six amperes.

The COURT.—I want to say this to the attorneys, I don't think there is much use of wasting much time on the question you are trying now.

Mr. J. HELLENTHAL.—I am trying to find out why [198—130] they imposed on the Court.

The COURT.—The attorney for the plaintiff company, if I understood him correctly, stated very frankly that the contention is just as stated in the complaint, that they want a surge—that is, they want more than the three hundred horse-power.

Mr. SHACKLEFORD.—Let it be understood in the record right here that our contention is that we are entitled to an uninterrupted current of three hundred horse-power, that if the defendant companies do not give us it that we are entitled to that thing which will give us its equivalent, namely, a starting surge.

A. (By the WITNESS.) I would like to say that I am not trying to evade any questions that Mr. Hellenenthal asked me. I am answering them the best I can. He does not ask his questions so one can answer them intelligently.

Q. (By Mr. J. HELLENTHAL.) Don't you understand me, Mr. Pullen?

A. No, I don't always understand you.

Q. You understand English, don't you?

(Testimony of W. S. Pullen.)

A. Yes, sir, I do.

Q. I want you to answer this question just because you have shown a disposition that you want to answer it. Don't care to insist upon it. If you could start with the same power that you use in operating your machinery and you had enough power to operate it follows that you had enough power to start; is that not true? A. Yes.

Q. Then, why the other day when you were shut down, why [199—131] did you start instead of coming up here to the Court trying to get something beside what you had any use for?

A. We tried every known means of starting that motor without coming up here; if we had been able to start it wouldn't have come up before you.

Mr. J. HELLENTHAL.—That is all.

#### Redirect Examination.

Q. (By Mr. SHACKLEFORD.) Just one question, Mr. Pullen. Counsel has asked several questions here with reference to the gas plant and the record has been left in a state where it might be misconstrued. I understand you to say that you are able to start this machinery with a gas plant and run on it for how long?

A. About an hour and a half.

Q. Now, just tell the Court of your attempt to make the flying-switch and get on the current of the defendant companies?

A. We tried to start this motor up, Judge, this way; by starting first on the gas engine and getting up speed and then throwing it over on to the Tread-

(Testimony of W. S. Pullen.)

well Company by the method known as a flying-switch. One time the motor stayed on the line I should say for about three minutes and then the circuit-breaker went out. One other attempt we made stayed on about two minutes. We tried it two or three times [200—132] and before that without any success. The circuit-breaker would fly out immediately.

Mr. HALLENTHAL.—That is all.

Mr. J. HELLANTHAL.—That is all.

Witness excused. [201—133]

[Testimony of H. L. Wollenberg, for Plaintiff.]

H. L. WOLLENBERG, being called and duly sworn, testified as follows on behalf of the plaintiff:

Direct Examination.

Q. (By Mr. SHACKLEFORD.) Mr. Wollenberg, I do not know as the record can be used in this trial on the merits so I will ask you the same preliminary questions I did the other night. Just state your name, residence and occupation.

A. H. L. Wollenberg; residence, Juneau, Alaska; occupation, mining engineer; occupied as chief engineer of the Alaska Gastineau.

Q. Are you in charge of all the electrical work of the Gastineau Company, Mr. Wollenberg?

A. I am.

Q. Let's see; what school are you a graduate of, Mr. Wollenberg? A. University of California.

Q. Are you in charge of all of the construction of the Salmon Creek power plant? A. I am.

(Testimony of H. L. Wollenberg.)

Q. Just state generally and for the record what the size—the proposed size and capacity of that plant is?

A. The Salmon Creek plant is to consist ultimately of two units which will develop six hundred horse-power and of two power stations, each power station consisting of two units. And we are now completing the installation of the first unit, which has a capacity of two thousand horse-power. And the general electrical system of our company consists of this source of power—that is the Salmon Creek [202—134] course of power and the gas engine auxiliary and the three hundred horse-power which is spoken of.

Q. These various works which you are engaged in at the present time? A. I am.

Q. How long have you been in active practice, Mr. Wollenberg, of your profession?

A. Well, since—since 1902, but after a few years in practical work I went to the University, so that four years of that time since 1902 have been occupied in the University.

Q. That is 1902 to 1906?

A. No, from 1904 to 1908 I was.

Q. Now, Mr. Wollenberg, have you that sketch—refer to this sketch. If the Court please, we would—if your Honor please, I would like to have the witness show you this sketch.

The COURT.—Has it been shown to the defendants?

Mr. SHACKLEFORD.—Just a sketch showing



(Testimony of H. L. Wollenberg.)

the general connections in a general way of the power plant.

Q. I wish you would explain to the Court the general system with reference to the connection of the Sheep Creek power plant with its various places of consumption and its connection with other power plants of the defendant companies?

A. The diagram shows the two generators of the defendant companies at Sheep Creek, each of which are marked one thousand kilowatts, rated at eighty-five per cent power factor; these two generators, [203—135] either independently or simultaneously, can send current into the bus-bars of that plant. On this diagram one line represents three phase—one line stands for three—from the bus-bars of this plant which is fed by either one or both of these generators and the feeder which I call the Treadwell feeder, being controlled by a time limit circuit-breaker and having on it the following indicated instruments: an ammeter, voltmeter and wattmeter, that feeder has taps off; part leads to the operations of the Alaska Juneau mine and then goes to furnish the Treadwell with the other power sources of that company; the circuit—the feeder which supplies the Alaska-Castineau occupies the same position with reference to the Sheep Creek plant that their own plant does. It, however, is controlled by an instantaneous circuit-breaker and an ammeter and a ——— recording wattmeter. The Nugget Creek generator and at times the steam turbine generator of the defendant

(Testimony of H. L. Wollenberg.)

companies operate in parallel with the Sheep Creek plant.

Q. That is to say, Mr. Wollenberg, that they are synchronized?

A. They are synchronised; that is an equivalent expression.

Q. Their general supply of electricity is thrown into one current; one set of currents?

A. Exactly.

Q. Now, have you explained the situation with reference to what appears upon the board which gives to us—what gives to the plaintiff company their [204—136] connection?

A. On the plaintiff company's there is an instantaneous circuit-breaker and an ammeter, while on the panel feeding their own circuit there is a time relay circuit-breaker and an ammeter, voltmeter and wattmeter.

Q. Now, then, I will ask you, Mr. Wollenberg, have you made any inquiry to find out the power consumed at Sheep Creek prior to the fall of 1909—have you that data with you? A. Yes.

Q. 1909, at the time this contract was entered into?

Mr. J. HELLENTHAL.—What has that got to do with it? I object to that, incompetent, irrelevant and immaterial.

The COURT.—Will you kindly read the question, I will rule on it.

Q. (Read by Reporter.) 1909, at the time this contract was entered into?

Q. (By Mr. SHACKLEFORD.) Sheep Creek

(Testimony of H. L. Wollenberg.)

mines—I will amend the question and refer to the Sheep Creek Mines?

The COURT.—Well, the Sheep Creek mines—does that include the Perseverance?

Mr. SHACKLEFORD.—No, sir; that is the mines mentioned in the letter offered this morning.

The COURT.—May I see it?

Mr. SHACKLEFORD.—That is the purpose mentioned also in the question.

Mr. J. HELLENTHAL.—I do not understand the purpose of this testimony, your Honor. [204½—137]

The COURT.—Just a moment, Mr. Hellenthal.

Mr. SHACKLEFORD.—I will explain the matter.

The COURT.—You might make yourself clear as to the purpose of the testimony.

Mr. SHACKLEFORD.—If the Court please, we desire to prove at this time that the power consumption referred to in the letter of Mr. Bradley was subject—that a surge was necessarily implied in the offer to contract from the surrounding circumstances.

Mr. J. HELLENTHAL.—Now, your Honor, we object to that testimony as incompetent, irrelevant and immaterial. It wouldn't make any difference what representations Mr. Bradley made or did not make; the action wasn't one brought to set aside the contract for false representations, for fraud; but if any fraud was practiced upon these people they have condoned the fraud and preferred to stand upon the contract and are asking for the enforcement of the contract itself, and the contract—the construction of

(Testimony of H. L. Wollenberg.)

the contract would necessarily depend on the terms of the contract itself.

The COURT.—Objection overruled; exception allowed.

Q. (By Mr. SHACKLEFORD.) Now, just go ahead, Mr. Wollenberg, and state to the Court—

A. Why, I made an investigation of the condition of the mine prior to that time and what equipment at that time, prior to that time and find it to be as follows: there was at the beach power-house, [205—138] which is located at or near the site of the present Sheep Creek plant, a compressor—

Mr. J. HELLENTHAL.—Just a moment, Mr. Wollenberg. I wish to add the further objection, your Honor; that is this, there is nothing to show—there is nothing to show that the Oxford Company at that time was owner of the Sheep Creek property. The fact of the matter is that they were not the owners of a large portion of the property at Sheep Creek. They were only the owners of a very small portion of the property situated at Sheep Creek. I presume—I don't know how Mr. Wollenberg—I might make another objection to Mr. Wollenberg's testimony—there is nothing to indicate how he inquired into these things, got from hearsay, from other people, or whether he knew anything about it himself; but, assuming that it wasn't hearsay, that Mr. Wollenberg knew about the matters himself, even then the question is what was included in Mr. Bradley's statement in regard to that Sheep Creek mine. If they didn't own any mines at Sheep Creek except what was on



(Testimony of H. L. Wollenberg.)

the beach there, why that ends it.

The COURT.—You can show that part of it on cross-examination.

Mr. J. HELLENTHAL.—No, your Honor, that is part of their case to show it, not ours.

The COURT.—I mean if the testimony of this witness is as to fraud. As to competency of the [206—139 testimony there is no question in the Court's mind, as already ruled. The Court wants to be informed of the conditions surrounding the parties at the time they entered into the contract in 1909. I assume that this will give some information to the Court. For that reason I have ruled as I have. You may proceed.

Mr. J. HELLENTHAL.—Your Honor will however require the witness to state the sources of his information?

The COURT.—You may do that on cross-examination.

Q. (By Mr. SHACKLEFORD.) Go ahead, Mr. Wollenberg.

A. There was at the beach a single cylinder compressor driven by a water-wheel of approximate size 14 inches by eighteen inches, which operated at one hundred revolutions per minute and which, if the compressor called for one hundred pounds' pressure per square inch would consume one hundred horse-power. There was in addition to that a displacing compressor of approximate sized cylinder eighteen inch diameter by eighteen inch stroke which, running at one hundred revolutions per minute and compress-



(Testimony of H. L. Wollenberg.)

ing air under one hundred pounds to the square inch would consume one hundred and sixty-five horse-power. There was also an eighty horse-power multipolar Westinghouse generator which would consume something more than its rated output of eighty horse-power, at least eighty horse-power, in operating at normal condition. There was also a [207—140] generator of twenty-five horse-power. The total of this installed equipment was 380 horse-power.

Q. That includes the stamp-mill?

A. That is the installation of the particular units either for producing electrical energy or for compressed air at the beach power-house; and the operations of the mine at that time involved the running of a 30-stamp mill, which would require between 50 and 60 horse-power; two rock crushers, which would require 25 horse-power; lights at various points of the camp, requiring 10 horse-power; and electric hoist in the mine requiring 15; two pumps requiring at least 10, and two air hoists requiring about 25. In addition to this, the entire output of air from the compressor itself at the beach was used in operating rock drills, except, of course, the air which leaked through the pipe-line on the way to the beach from the mine. Assuming, however, that there was a large leakage and that at least five drills were necessary to the operation of the mine for the supply of its 30-stamp mill and necessary development work we would have 75 horse-power for drills. The total of these figures is 261 horse-power.

Q. That is the total consumption?

(Testimony of H. L. Wollenberg.)

A. Accounted for.

Q. Probable total consumption from that equipment?

A. Exclusive of the line loss, that is in the air loss.  
[208—141]

Q. (By Mr. J. HELLENTHAL.) Be how much?

A. Two hundred and sixty horse-power.

Q. (By Mr. SHACKLEFORD.) That air line—that present air line is on the property there?

A. Well, part of it there is on the property.

Q. Not in use though? A. It is dismantled.

Q. The compressor has been moved up—there is a new compressor installed right at the mouth of the tunnel? A. By our company, yes.

Q. Now, assuming that the power consumption at the Sheep Creek mines in October, 1909, at the time this contract was executed, with a starting load, could that property have been operated on two hundred horse-power without considering the fact that the Treadwell Company was not going to give a starting surge? A. Repeat the question, please.

Q. Well, assuming for the moment that it was the intention of Mr. Bradley not to give a starting surge upon the current which he proposed to give to the plaintiff company or to its compressor, could that property have either been operated or started on the two hundred horse-power provided for in the contract at the time it was drawn?

A. Well, it depends on—you would apply that two hundred horse-power to the same machines that were then in use?

(Testimony of H. L. Wollenberg.)

Q. Yes—I am assuming—I am assuming that the plant [209—142] would necessarily be reconstructed because of the change in the compressor, the ground upon which the compressor having been—on which the compressor was situated having been given over to the defendant companies?

A. Well, the compressor they had in—the large one of the two, is comparable in size with the one which we are now endeavoring to start from this current and certainly could not have been started if arranged as our compressor is now arranged, that is driven in that way.

Q. Could it have been started with two hundred horse-power without a reasonable surge?

A. Not if installed with a motor as this one is.

Q. Now, I wish you would go ahead and describe to the Court the exact working condition with reference to starting of the machinery at the Perseverance mine and the operation and conditions with reference to the operating conditions under which we are permitted to take this so-called three hundred horse-power current at the present time?

A. Well, our installation consists of a two hundred horse-power form K motor, belt connected to a compressor. The compressor is equipped with devices for unloading the compressor so that it starts without—without being against any air pressure load—the transformation and lines leading from Sheep Creek to that motor and other lights which are a minor part of the same load but which we did not have on when we tried to start—start the motor

(Testimony of H. L. Wollenberg.)

[210—143] in every way—I mean best engineers' practice and with standard practice, to the best of my knowledge and belief, that we were connected to a generating plant of large capacity consisting of two or more generating units operating in synchronism or leading into the same line and on which the voltage is attempted to be maintained uniformly high—uniformly constant currents, a condition together with the characteristics of this motor which we have in use, which upon starting that motor causes a loss of current or amperage. Now the—that condition exists in part due to the inherent factor of that motor which was to take a large surge upon starting, and in part due to the ability of the generating system to yield that surge of power. Now, in thinking of an electrical circuit and speaking of so much power and such and such a sum being delivered at a point, it is misleading because the power doesn't occupy that circuit or travel upon that circuit until the load exists upon that circuit for it. In other words, there is no way of putting fifty-six amperes at twenty-three hundred volts at the end of a line and saying "Take it." The amperage on that line is going to be controlled by the loads upon that line. In this system where the voltage is artificially maintained high for the purpose of keeping these various plants operating in synchronism, it is a necessity for the operation of the plant in parallel; but it is not a necessity for the operation [211—144] of single plants.

Q. In other words, it is not a necessity to the de-



(Testimony of H. L. Wollenberg.)

fendant companies in view of the fact that they have synchronized two or three different sources of electrical supply, some of which are not mentioned in the contract in this case?

A. That is it exactly. Well, this motor which we have connected with this compressor is a standard ordinary motor for mining and milling and general service and has advantages over any other motor for similar work which make it the ordinary motor used. It has a characteristic that—when you start it it will take a surge of current. Now, under normal conditions if it is deriving that current from some source which is simply capable of a certain output it will compensate for that increase in amperage by a decrease in voltage, but if it can wet it it will take that surge of amperage and if you have an artificially maintained high voltage at the same time, why, of course, there is a certain surge in the apparent kilowatts.

Q. That is to say theoretically you require more than three hundred horse-power to start three hundred horse-power machinery, theoretically under those conditions?

A. Under those conditions you do, yes. Yes, under those conditions you do so. Now, that condition requiring the surge for starting is a condition of such brief duration that it does not affect materially the service of the power available at [212—145] the power plant that supplies that energy.

Q. That is this surge doesn't do any particular injury—or what if any particular injury would this



(Testimony of H. L. Wollenberg.)

surge do to the general supply or surplus supply of the defendant companies that they obtain from the same plant?

A. Well, considering the case as it is with their plant carrying a load perhaps in excess of two thousand or three thousand horse-power, I am not informed on that point, why this surge of amperage is a trifling matter on their system and will not practically or theoretically have any disastrous or even seriously undesirable effect on their system.

Q. Would it have any power driving qualities so far as practical operation is concerned?

A. Not so far as practical operation is concerned, it would momentarily, it would momentarily call for a surge of amperage and since the voltage is maintained constant that will imply a certain surge of power under the existing conditions; that surge of power occupies such a brief duration that it will be absorbed by the system without any particular effect and no better proof of that can be obtained than an actual demonstration at the plant of the company. It is a simple matter to absolutely prove at the plant of the defendant companies.

Q. Now, it has been said here, Mr. Wollenberg, that when we start the machinery at the Perseverance mine we actually take nine hundred horse-power, [213—146] that is to say that we start at three hundred or you take three times the normal load. Is that actually true, with horse-power measured in watts?

A. Well, I can't answer that exactly because the

(Testimony of H. L. Wollenberg.)

surge is of such momentary duration, and then you might make—the power factor at this particular time, starting time, is unusually low—the power factor of this motor upon starting is very low, which reduces the power which corresponds to this surge of amperage—power always being the product of amperage times voltage times power factor.

Q. Let's take this instance, for example: The defendants in their answer in this case filed this morning aver that the Sheep Creek plant at the present time is producing five hundred horse-power. Is there any doubt in your mind as to your ability to start machinery consuming three hundred horse-power, less line losses, under those conditions?

A. There is no doubt in my mind whatever. There can't be any doubt in my mind when we were able to start the identical apparatus with a gas engine plant whose maximum production is a little some over two hundred horse-power.

Q. Well, take for example the instance of the Sheep Creek power-plant at a time when its flow of water is so reduced it is only producing three hundred horse-power, what would be the result with reference to starting? Would you be able to start with three hundred horse-power? [214—147]

A. Certainly would, and even with the Sheep Creek power plant only producing three hundred and then disconnected from their system, which it properly should be, when only producing three hundred or less should be disconnected from their system, and where it was it would occupy a position exactly like the

(Testimony of H. L. Wollenberg.)

gas plant, being an independent source of power, and could absolutely start up.

Q. What do you say as to that condition where the flow of current was 300 horse-power, no more and no less, and was uninterrupted?

A. I should say that it would unquestionably start such a load.

Q. Under the present conditions, is it possible for you to secure the use or the benefit or the enjoyment of 300 horse-power without taking a starting surge of amperage?

A. No, not under the present conditions with the apparatus as installed.

Q. Well, I am speaking of the conditions as they exist at the Sheep Creek plant?

A. And as they exist at the Perseverance mine.

Q. Yes, sir. Now, the drawing of this current upon these surges of amperage, I wish you would assume for the sake of the question that the value of the horse-power on the peak load is \$87 per annum. I want you to demonstrate to the Court the value of one of those surges as it would be estimated on a wattmeter?

A. Well, if you take power at \$87 a year it is [215—148] equivalent—

Mr. J. HELLENTHAL.—Your Honor, I think that is quite immaterial and irrelevant.

The COURT.—Only on the question of damages.

Mr. SHACKLEFORD.—I think, if the Court please, we have a right to go, of course, not only to some extent into the question of damages but into

(Testimony of H. L. Wollenberg.)

the illustration of all the effects produced in the other of all the plant and also on the doctrine that it is the duty or the function of the Court in administering and construing a contract to ascertain whether it is dealing with minimums or whether it is dealing with something that is of substantial effect.

The COURT.—Well, I doubt whether the value would have very much to do with that part of the case. You may proceed.

A. Well, if power is assumed to be worth \$88 a year, it works out as being one cent for every horse-power, or the use of a horse-power for one hour is worth one cent. Well now, we will take—the defendant companies claim that we consume three times the normal horse-power during a start, in other words we will assume for the moment that we consume 300 horse-power during a start. Now, I take 600 horse-power, which we have assumed to consume in starting; if that surge lasted one second its commercial value would be one-sixth of a cent; if it lasted 20 seconds it would be four cents.

Q. That is within the limits, however, of the length of the probable surge? A. Very much.

The COURT.—We will adjourn until to-morrow at 10 o'clock, when this case will be taken up. [216—149]

**[Testimony of H. A. Bishop, for Plaintiff.]**

H. A. BISHOP, being called and duly sworn, testified as follows on behalf of the plaintiff:

Direct Examination.

Q. (By Mr. SHACKLEFORD.) Mr. Bishop,

(Testimony of H. A. Bishop.)

just state your name and residence.

A. H. A. Bishop; Juneau, Alaska.

Q. Mr. Bishop, were you in charge of the Sheep Creek power plant prior to its reconstruction, with the Treadwell Company at any time?

A. I was in charge at the time it was closed down. I don't remember what year. It was six or seven years ago.

Q. You have—you know what machinery was in that power plant and what was in the Sheep Creek mine? A. Yes.

Mr. J. HELLENTHAL.—This testimony, your Honor, I object to for the same reason I objected to the same testimony yesterday.

The COURT.—The record may show the same ruling and exception allowed you.

Q. (By Mr. SHACKLEFORD.) All right, Mr. Bishop, just give the machinery?

A. In the power-house?

Q. Yes, state whether in the power-house and go all over the property.

A. In the power-house at the beach there was one straight line compressor, 14-inch cylinder in diameter and 18-inch stroke, I think—I would not be positive about the 18-inch stroke, whether 16 or 18—and there was one duplex compressor, the diameter of the cylinders were 16, and my recollection is that the stroke [217—150] was also 16; and there was one 80 horse-power Westinghouse direct current 500 volt electric generator; and at one time they had a 25 horse-power direct current generator of the Sprague type, 500 volts.



(Testimony of H. A. Bishop.)

Q. This is what was known as the lower power plant at Sheep Creek? A. That was on the beach.

Q. There was another power plant up above where the intake of the lower power plant was, wasn't there? A. Yes.

Q. Do you recollect approximately what the capacity of that plant was?

A. Well, there was installed in it a 75 horse-power Sprague generator and 75 horse-power C. & C., although they never both operated at the same time.

Q. Now, going on up the creek, what machinery was there in operation at the Sheep Creek mine?

A. At the mine?

Q. At the mill—start in the mill and going on up to the mine?

A. Well, in the mill there was one 50 horse-power C. & C. direct current 500 voltameter and one Sprague 50 horse-power, same voltage, direct current.

Q. Beside your motor, what was there?

A. And there was a 25 horse-power motor which ran the rock crusher in the top of the mill, and that was all of the machinery—power machinery in the mill excepting a water-wheel which ran the vanners.

Q. Now, outside of the motor, the generators of the motor described, what was there for this power to [218—151] operate—there was a mill—what was the capacity of the mill?

A. 30 stamps in the mill.

Q. How many rock crushers? A. Two.

Q. How many lights, approximately, Mr. Bishop?

(Testimony of H. A. Bishop.)

A. O, I suppose there was probably one hundred.

Q. What about the mining operations, what was operated in the mine proper—was there anything else in the mill besides the rock crusher, the lights and the stamp-mill? A. Nothing.

Q. Well, now, at the mine, what was it operated by—power?

A. At the mine they used air drills and they had two hoists which used air; they were—one was a double cylinder hoist and one was a single play—small one was a timber hoist I believe, used only for hoisting timber; the other for hoisting the bucket. That weighed, I think, about 500 pounds, that is carried 500 pounds of ore.

Q. How much power was necessary to run that beach compressor—how much power would it take, approximately, Mr. Bishop?

A. Well, I don't know—I don't know that I ever calculated the hoist power on it. I should judge that it probably took something like 150 horse-power. It was a 3-inch nozzle, usually, I think, it was about 3 inches, might be fraction of an [219—152] inch more or less on the pipe.

Q. What was the head? A. 270 feet.

Mr. SHACKLEFORD.—I think that is all.

Cross-examination.

Q. (By Mr. J. HELLENTHAL.) When was this, Mr. Bishop—I say, when was this?

A. When?

Q. Yes.

A. That was at the time the mine was operated by

(Testimony of H. A. Bishop.)

Mr. Hammond and Malony, about seven years ago, I think; I don't remember what year it was.

Q. (By the COURT.) Operated by whom—Malony and whom?

A. Mr. Hammond and Mr. Malony and Meyers.

Q. (By Mr. J. HELLENTHAL.) Those two compressors, Harry, never ran together?

A. Yes, sir, they always ran together.

Q. They always ran together?

A. Yes, when there was water enough to run them.

Mr. HELLENTHAL.—That is all.

Mr. SHACKLEFORD.—That is all, Mr. Bishop.

Witness excused. [220—153]

**[Testimony of H. L. Wollenberg, for Plaintiff  
(Recalled).]**

H. L. WOLLENBERG, heretofore duly sworn, being recalled for further direct examination, testified as follows, on behalf of the plaintiff:

**Direct Examination.**

Mr. SHACKLEFORD.—If the Court please, I think I can close our case very rapidly and save a good deal of time by offering the general outline of testimony that was offered the other day by offering Mr. Wollenberg's deposition transcript and Mr. Zackhouse at this hearing, and then I will examine Mr. Wollenberg on the more important features with reference to the power factor and try to get through.

Mr. J. HELLENTHAL.—I shall object to that, your Honor. I want the testimony in this hearing in this record. The witnesses are here in this controversy.

(Testimony of H. L. Wollenberg.)

The COURT.—Well, I presume I would have to sustain your objection. You may proceed.

Mr. SHACKLEFORD.—Very well.

Q. Well, start, Mr. Wollenberg—originally the power of this power line was opened to our company, to the plaintiff company by the defendant companies, about the 8th of November?

A. On the 8th of November.

Q. Did you have any difficulty in starting?

A. Well, at the time that they—that that power was formally turned over to us simply constituted the closing of a switch, and the closing of the switch didn't transmit any power on to the line until we [221—154] put a load on it, and that same day, I believe, we put a small lighting load on calling for a few amperes, and the following day we started the Sheep Creek compressor with it, perhaps the same day—in the afternoon of the same day we started the compressor of the Sheep Creek portal with it without difficulty.

Q. Well, then, later what was done with reference to putting the load on the Perseverance—about what time?

A. Perhaps if I just go through a chronology of it it will be the shortest way. We had a load on there from November 8th continuously until November 29th, when the circuit-breaker opened and it was closed again that day, and then—

Q. How long was it open?

A. It was open an hour at that time.

Q. All right.

(Testimony of H. L. Wollenberg.)

A. Then on December 2d the combined loads of the Sheep Creek from the Perseverance plants were put on the circuit.

Q. Now, at that time, Mr. Wollenberg, have you any means of knowing what the circuit-breaker was set at, that is at what amperage?

A. Merely hearsay. It has never been possible to enter the plant of the defendant companies and determine by simply looking at their meter what it was set at, for they installed there a meter which does not read according to the calibrations on the face of it, according to the [222—155] readings on the face of it.

Q. That is an ammeter? A. An ammeter.

Q. That is set on the plaintiff company's line?

A. Yes. And in addition to that, it would not be possible, except by actual test, to know what that ammeter would read when the circuit-breaker went out. Of course, the circuit-breaker is marked for a certain setting, but the only real accurate way is to observe it when it goes out.

Q. Well, what I mean to say is, approximately, what was that circuit-breaker set at, from your observation at that time?

A. Well, we know that at that time we were drawing up to 80 amperes without causing the circuit-breaker to go out; that we have of our own definite knowledge, so we could say it was set above 80 amperes.

Q. Now, approximately, when was that changed?

A. Well, our records indicate that it was changed



(Testimony of H. L. Wollenberg.)

about the 6th, apparently the 6th of December, because on the 8th of December the circuit-breaker went out at a load condition which we have means of knowing was somewhere around 50 amperes, whereas previous to the 8th we know we carried 80 amperes on that circuit.

Q. While we are on this subject, I wish you would go *through book* there and explain to the Court, into the record, and to the Court the number of interruptions that have occurred to this current and the length of time of interruption—the character of [223—156] service that has been given to us under this contract for an uninterrupted current.

A. Well, the first occasion of which I have a record here is on the 29th, when the circuit-breaker went off at 4:30 and was closed an hour later. In that instance, I am informed, it was closed by the operator at the Sheep Creek plant of the defendant companies. On the 5th of December the circuit-breaker—that should be the 4th of December, that is the night of the fire—the circuit-breaker went out at about midnight some time and was closed at 9:30 the next morning. On the 8th the circuit-breaker went out at 9:30 P. M. and was closed at 9:30 the following morning, twelve hours later. On the 9th it went out at 9 P. M. and was closed at 9 A. M. the next morning, also an interval of twelve hours. On the 11th it went out at 10 A. M., and was closed at 11 A. M., an interval of one hour. On the 24th—there was no interruption—on the 25th the circuit-breaker went out at 11:30. It was closed immediately. On the

(Testimony of H. L. Wollenberg.)

26th it went out at 3:30 P. M. It was closed at 5 P. M. And then on the 27th it went out at noon; was closed at 2 P. M., and then it was out again at 11:30 A. M. and was closed at 2:30 P. M., and then went out again at 2:35 P. M.

Q. (By the COURT.) On what day?

A. This is the 28th—the 28th at 2:35 P. M. it went out and was closed at 4:30 P. M. On that particular instance, on the 28th, the plaintiff company was endeavoring to start the motor on—by synchronizing [224—157] or by flying-switch—trying both ways.

Q. (By Mr. SHACKLEFORD.) With the gas plant?

A. Yes, and had so advised the defendant companies, and at the time you will note there that it went out twice that afternoon, and at 2:30 when it was put in we notified them that we were going to make another trial and to kindly remain at the plant and restore the circuit-breaker. That request was not complied with, and when we made our second trial at 2:35 we had to wait until 4:30, until the man came back from Treadwell.

Q. Now, Mr. Wollenberg, I want to ask you—

A. That wasn't all I had to say.

Q. You have some more?

A. Yes. That takes us up to the 29th—well, on the 30th, having made these unsuccessful attempts to start the motor in any way whatever—having attempted every known device that we could think of, on the 30th at 8 P. M. we had a preliminary hearing in this court and on the 31st we started it about 3

(Testimony of H. L. Wollenberg.)

o'clock under stipulation with the defendant companies. The following morning at 8 o'clock, approximately, the circuit-breaker went out, and the starting surge was refused, so that then we were unable to start until 7 o'clock that evening, by order of the Court. That takes us to the first. Then on the morning of January 7th the power went off the line at 2:15 A. M. and came back on our line at 9:30 A. M. This is the time of the short circuit mentioned by the defendants which occurred day before yesterday morning, and we were then refused a starting [225—158] surge until 9:20 that morning, when a man came over from Treadwell. That is, we were refused—when we notified the Treadwell power plant and we were unable to get notice to the Treadwell earlier than that—that is, we tried from 2:30 and we were finally allowed to start at 9:30.

Q. You were able to get Treadwell on the phone shortly after the break?

A. No, we got the Douglas operator and got no connection with anyone at Treadwell, no answer on the line until 6:30.

Q. Well, now, just explain so it will not only be clear to the Court but clear in the records the distance between the place known as Treadwell and the power plant of the defendant companies here—the situation.

A. Well, Treadwell is located on the western side of Gastineau Channel and the Sheep Creek powerhouse on the easterly side; the width of the channel, or the distance between the Treadwell wharf and the Sheep Creek wharf, which is the only natural way

(Testimony of H. L. Wollenberg.)

of transportation between the two places, is probably a mile and a half—two miles.

Q. Across Gastineau Channel?

A. Across Gastineau Channel, which is an inlet from the North Pacific Ocean and subject to the—to severe weather conditions.

Q. Particularly in the winter?

A. Particularly in the winter. Then from the wharf landing at Sheep Creek to the Sheep Creek power-house is about 2,000 feet, over which distance there [226—159] is no road and which it is difficult to travel along the shore at night or at high tide.

Q. Now, I want you to explain into the record also the situation of the defendant companies at that plant with reference to having electricians constantly in the plant. How many people are employed by the defendants who have charge of the Sheep Creek plant and are there all the time?

A. Well, to my knowledge, there are three operators in that plant and one of them is on the service at the plant—in the plant at all times of the day, and that operator performs all the ordinary functions of an operator in such a generating plant, including the necessary switching that is done on their own lines and—

Q. Do you know of any instances where switching has been necessary over there except where the plaintiff company has been involved in the thing, where they have required delays of this sort?

A. I do not.

Q. Have you had any talk with anyone represent-



(Testimony of H. L. Wollenberg.)

ing the defendant companies about the difficulty and inconvenience of this service?

A. I have talked to their operators at the Sheep Creek plant in an effort to find some explanation of such remarkable procedure and they were able to offer none.

Q. Has any explanation ever been offered by Mr. Kinzie or anyone else as to the reason why they insist [227—160] upon interrupting this current after it has once blown out or after the circuit-breaker is once thrown out for a period of from one to four to five to six hours before it is restored?

A. Well, Mr. Kennedy has remarked to me that it was a penalty for our trying to draw more power.

Q. I see. Now, I will ask you if about the time the first stipulation or temporary restraining order was issued out of this court, if a request was made of the defendant companies to permit the plaintiff to place a wattmeter upon the panel board or in the power-house at its connection with the defendants' line?

A. Yes. On December 29th I personally went to the Sheep Creek power-house of the defendant companies and requested the chief operator to allow me, for the Alaska-Gastineau Company, to make a wattmeter measurement of the current being supplied us. He replied that it was not within his power to do that, and rang up Mr. Kinzie and informed me immediately that the request was refused.

Q. That is you intended to put a wattmeter on there at that connection?



(Testimony of H. L. Wollenberg.)

A. At that connection on our feeder circuit, yes.

Q. Now, at the time the power was turned on, after the last restraining order, I think it was on the first of January—on the morning of the second, what, if anything, was done with reference to the exclusion of the operators of the plaintiff company from being present and observing the situation in that power-house [228—161] with reference to the matters and arrangements at the time that current was turned on?

A. Well, we sent a man down there at the time that it had been arranged for turning the current on and he was informed that they didn't want him in there, and a day or two later—

Q. Was he given any information as to where that instruction came from? A. I can't say as to that.

Q. (By Mr. J. HELLENTHAL.) You was present—what is it—all hearsay?

Q. (By Mr. SHACKLEFORD.) Now, do you know anything, Mr. Wollenberg, about the closing out of the telephone connection and the refusal to answer the telephone—there is a telephone line between your gas plant and their line?

A. Why, no; I have no personal knowledge of any refusal to answer the telephone. I called there personally three days ago and was allowed entrance to the plant but was informed by the operator that he had orders from Mr. Kinzie to give no information to the Alaska-Gastineau people and not to have them in there. I asked him if he intended to ex-

(Testimony of H. L. Wollenberg.)

clude me from the power-house and he said that was his orders.

Q. I will ask you, Mr. Wollenberg, to explain who installed the 'phone connections and for what purpose that connection was made.

A. Why, we installed the 'phone connection connecting our line with the Sheep Creek power plant, because [229—162] in the operation of any electrical distributing system there will frequently arise conditions where it is necessary for the generating plant to be notified of certain conditions or for the consuming plant to be; and in an effort to make all provisions that we could for continuous service and satisfactory service we installed that telephone connection at our own expense.

Q. Assuming for the time being that a circuit-breaker may properly go out, do you know what length of time ought to be—what is the maximum length of time that ought to be consumed in getting that power back on the line?

A. Yes, the ordinary practice in a generating plant if a circuit-breaker on the line opens up is to replace the circuit-breaker at once, immediately—if the circuit-breaker flies out and it indicates a continuance of the disturbance on the line which originally made the circuit-breaker fly out, then the generating plant attempts to locate the trouble either by communication with the points along the line or by being communicated with by some point along the line where such disturbance or trouble exists.

Q. How long ought it to take to make the connec-

(Testimony of H. L. Wollenberg.)

tion again after one of these ordinary interruptions as described by you?

A. Why, their circuit-breaker at that point might go out without the operator's noticing it, he might [230—163] be in another part of the building. If such should be the case, might take until we could raise him on the telephone to notify him it was out and ask him to replace it.

Q. Otherwise it oughtn't to take thirty seconds?

A. It oughtn't to take any time otherwise, unless he should chance to be not near the telephone or the switch-board.

Q. There is one other question, Mr. Wollenberg, in connection with the power situation—is there any other source of power than the power of the defendant companies from which power could be drawn at the present time for the use of the plaintiff?

A. There is not; the plaintiff company has a gas engine plant which is inadequate to carry the Perseverance load, and a number of attempts have been made and every effort has been made to have it carry that, and they have failed, and there is to my knowledge no other source of power that can be utilized or purchased or in any way made available for that mine.

Q. Now, Mr. Wollenberg, we will get down to this question as to how much power we are being deprived of by these operations complained of in the plaintiff's complaint—I wish you would please give to the Judge the standard definition of power factor.

(Testimony of H. L. Wollenberg.)

A. Well, I would like to read that directly from the [231—164] Electrical Engineers' Pocketbook by Foster. I am reading from paragraph 3, page 504, under chapter entitled "Definition and Explanation of Terms." The same being a copy of the standardized rules of the American Institute of Electrical Engineers, and reads as follows: "III. Power Factor and Reactive Factor. The power factor in alternating current circuits or apparatus is the ratio of the electric power in watts to the apparent power in volt-amperes. It may be expressed as follows:

$$\frac{\text{true power}}{\text{apparent power}} = \frac{\text{watts}}{\text{volt-amperes}} = \frac{\text{energy current}}{\text{total current}} = \frac{\text{energy voltage}}{\text{total voltage}}"$$

and then it follows with other equivalent technical definitions.

Mr. SHACKLEFORD.—In addition to the witness reading it, if the Court please, I desire to offer that portion of the book in evidence and ask leave to have it transcribed by the reporter exactly as it stands.

Mr. J. HELLENTHAL.—No objection.

The COURT.—It may be so transcribed.

Q. (By Mr. SHACKLEFORD.) Now, Mr. Wollenberg, in this particular instance in controversy, what is the power factor involved?

A. Under the present operating conditions the power factor of our circuit is at the time I determined it—was at the time I last determined it 70 per cent. As the conditions are not changing very much that is probably a nearly constant average.

(Testimony of H. L. Wollenberg.)

Q. Now, assuming the power factor to be 70 per cent, what amperage would you be entitled to at the Treadwell switch-board at their Sheep Creek property?

A. Assuming the power factor to be 70 per cent and 300 horse-power to be delivered— [232—165]

Q. Yes.

A. —at 2,300 volts as the voltage of delivery the necessary amperes would be 80.5.

Q. That is somewhere near as you can estimate—that is somewhere near in the neighborhood of the original setting of this ampere reading?

A. We were able to draw 80 amperes at the original setting. The setting must have been you know above that.

Q. Now, if the power factor is 70 and you were getting 80 amperes, would you obtain from the Treadwell line at their plant any more power than you would if the power factor was unity and you received 56 amperes?

A. No more power. In each case you would receive exactly 300 horse-power.

Q. Now, if your power factor was seventy—not unity—and you secured 56 amperes of current, what actual horse-power, would you be receiving from the Sheep Creek power plant?

A. If the power factor is 70 and we were receiving 56 amperes we would actually receive 210 horse-power.

Q. (By the COURT.) That is assuming that the voltage is the same?



(Testimony of H. L. Wollenberg.)

A. That is assuming that the voltage is the same; yes.

Q. (By Mr. SHACKLEFORD.) All these questions assume the voltage to be 2,300 volts?

A. Yes.

Q. That is the condition—the condition stated in the last question is the condition which now exists, Mr. Wollenberg, isn't it?

A. It is exactly the condition that now exists.

Q. Now, I wish you would make it clear to the record in this case—to the Court—what becomes of that extra 90 horse-power—do you get it, or does it go into the [233—166] surplus power of the defendant companies?

A. It goes into the surplus power of the defendant companies and is utilized by them in their operations.

Q. Now, Mr. Wollenberg, I wish you would refer to those authorities as you have at hand and explain to the Court what is the recognized usage at the present time with reference to continuity of current and with reference to the use of time relay circuit-breakers?

A. Well, I would like to read from page 956 of Foster's Electrical Hand-Book under the paragraph heading "Protective Relays," the general subject being switch boards. "Time element feature" is the paragraph heading—reads as follows: "Continuity of service is an essential consideration in all installations, and interruptions of the service cannot be tolerated unless the protection of the apparatus

(Testimony of H. L. Wollenberg.)

demands it. There are, however, certain abnormal conditions of current flow which may exist for a short time on a circuit without causing serious damage, such as swinging grounds, intermittent short circuits, synchronizing cross-currents, etc. The simply instantaneous relay would in such cases act instantly and interrupt the service unnecessarily. There has, therefore, arisen the necessity for relays having a retarded or time element action." Then reading the representative practice in switchboards, I would like to read from page 959 under the subject "Protection of alternating current systems. Generator circuit protection. Representative practice recommends the placing on generator circuits of either a reverse current relay, with [234—167] a time element feature, or else the entire elimination of automatic protection. FEEDER CIRCUIT PROTECTION. For feeders at the power station and, overload inverse time element relays are desirable. For feeders at the sub-station end, overload and reverse current inverse time element relays are desirable."

Q. Now, Mr. Wollenberg, I wish you would explain—there has been some talk here—that book that you have just been reading from is the same book that Mr. Hellenthal was referring to yesterday—one of the authorities on cross-examination of Mr. Thane read portions into the record.

A. It is another copy of the same work.

Q. (By the COURT.) What year—edition?

A. This is the fifth edition of 1908.

(Testimony of H. L. Wollenberg.)

Q. (By Mr. SHACKLEFORD.) I wish you would—there has been a good deal said by the defendants in this case about the danger to them of using a time relay circuit-breaker—I wish you would explain to the Court the practical situation with reference to the use of time relay circuit-breakers and the danger to them as compared from such an operation—as compared to any other ordinary operation, through short circuit.

A. The time limit circuit-breaker, such as we have been speaking of all this time, has been what is known as an inverse time relay—the feature of it is that for a given setting it does not open the circuit unless that amperage is exceeded for a certain period of time; but the period of time which elapses, as a function, is dependent on the [235—168] intensity of the overload and a circuit-breaker—the inverse time relay circuit-breaker will open instantly on a dead short circuit and it will be affected in a variety of ways by the                      and the rating for which it is set. But, as I just read from Foster, the time relay has been devised to furnish protection to the generating apparatus and at the same time avoid unnecessary interruptions of the service on the feeder line.

Q. A dead short circuit, however, would open the switch even if the time relay were on?

A. It would, if it were an inverse time relay switch.

Q. Well, now, if that is the case, if opened instantaneously on a dead short, would their lines be ade-

(Testimony of H. L. Wollenberg.)

quately protected?

A. Absolutely protected. The situation of our load on this line is in no wise different from the situation of any of their own power consumption. From the same bus-bars to which our feeder lines are attached their feeder lines leave through a time relay switch, and their operator informed me that that time relay switch is set at 500 amperes and that is the switch which furnishes protection to their generating apparatus from their own system.

Q. Now, referring to—there may be some doubt as to the situation with reference to the starting of these plants by the gas plant, that is, I don't know as the testimony is exactly clear—I wish you would explain to the Judge just how we are able to start the Perseverance machinery from the gas plant if we are unable to keep it up and if we are—if we have been unable to use it in making further connection with the defendant companies by way of a flying-switch? [236—169]

A. Well, the situation is this—that gas plant develops in the neighborhood of 200 horse-power. It can at any time be started—brought up to full speed—and the motor at the Perseverance can be started on it. After starting the motor on it, the compressor can be allowed to compress air and build up a load and it will carry that load a short period. We carried it for a period of an hour and a half or so and at the end of such time the overheating of the apparatus was such that we couldn't carry it any further. We are thus able to start the Perseverance

(Testimony of H. L. Wollenberg.)

motor and compressor and run it under load but not continuously, owing to the inadequacy of the gas engine plant.

Q. Now, I wish you would explain as to what is meant by the statement that you can start a motor by hand so far as its practical bearing on the ability to use a motor is concerned.

A. Well, you can turn a motor over by hand and in that way—

Q. That is without any load?

A. That is without any load; yes. The compressor being relieved, being unloaded, but you couldn't bring up to speed by hand and then throw it on a circuit because its speed is some six hundred revolutions.

Q. Now, I think the only other point—

A. Just a moment; you asked me about the flying-switch.

Q. Go ahead.

A. Well, having demonstrated that although able to start the Perseverance motor and compressor and able to [237—170] run it without a load for a short period, you can not carry that load. We attempted to start the motor—of course, it is belted to the compressor, but the compressor is unloaded at the time it is started. We attempted to get that into its full motion with a gas engine plant started without any load on a compressor—under the friction ground we would have time then to make a flying-switch on to the Treadwell line, but in each case that we did that apparently the cessation of one current and the lowering it or another caused a surge sufficient to



(Testimony of H. L. Wollenberg.)

throw the circuit-breaker out. We expected to be able to make that flying-switch and tried it a number of times, but at each time there occurred a surge that was sufficient to throw the circuit-breaker out.

Q. Now, Mr. Wollenberg, I wish you would explain to the Court what is the only known method of measuring power where horse-power is called for, or kilowatts.

A. I would like to quote in answer to that from page 69 of Foster, under the paragraph heading, "MEASUREMENT OF POWER UNDER ALTERNATING CURRENT CIRCUITS. In alternating current circuits having inductants in any part of the circuit, such as motors, unloaded transformers, and the inductants of the line itself, the product of the values of the current and the E. M. F. as shown by an ammeter and voltmeter does not give the power in the circuit, since the current is not in phase with the E. M. F." By way of explanation, the E. M. F. is the same as voltage. In alternating current circuits having inductance [238—171] in any part of the circuit, such as motors, unloaded transformers, or inductance of the line itself, the product of the values of the current and the E. M. F. as shown by an ammeter and voltmeter does not give the power in a circuit since the power is not in phase with the E. M. F.

Q. Now, that method of computation which is contained in that paragraph is the exact method which is used by the defendant companies in setting their circuit-breakers and their allowance of power to the plaintiff?

(Testimony of H. L. Wollenberg.)

A. It is the exact method that they propose. Now, this paragraph contains and gives the general formula that the power in alternating circuits is equal to the voltage times amperage times the power factor, and, in case of three phase circuits, times the square root of 3. That, of course, is accepted. Now, as regards the—that is, so to speak, is the theory by which the power is measured. That is the—that is the reason. Now, the actual measurement of power is covered in another paragraph that I would like to read.

Q. Very well, proceed.

A. Concerning wattmeters.

Q. (By Mr. S. HELLENTHAL.) What page is that on, Mr. Wollenberg?

A. Just a minute. It is on page 72 of Foster, called “WATTMETER METHODS.” It says, “For measurement of power in electric circuits the wattmeter gives the quickest and most accurate results. Since the instrument mechanically integrates the products of the instantaneous values of current and E. M. F., the power is indicated directly, regardless of the [239—172] power factor.” If you accept the truth of the general statement for power in alternating current circuits, that is to say, if you accept the truth, that cannot be contested that it is measured by the product of amperes times the volts times the power factor. It is clearly impossible to measure them by any device which does not—which is not influenced by all these things, and the wattmeter is the device with which to do this, “since the

(Testimony of H. L. Wollenberg.)

instrument mechanically integrates the product of the instantaneous values of current and the E. M. F., the power is indicated directly, regardless of the power factor."

Q. Now, then, the only other thing that I can think of, that is—probably some question about the use of the synchronous motor—do you know of any synchronous motor in this mining district or within a thousand miles from here?

A. I know of none in use.

Q. Now, the defendant companies have a number of motors in use, haven't they? A. A lot of them.

Q. Do you know of them having a synchronized motor in use? A. Not in use, I know of none.

Q. Do you know any common use of synchronized motors in ordinary mining operations of the power and character that we are using, considering the amount of power that is being drawn?

A. No, I do not.

Q. I want—I wish you would explain to the Judge what the practice—what the use of synchronized motors is [240—173] with reference to aiding the generator and what the practical explanation would be with reference to that.

A. Under alternating current circuits the power factor does not represent a loss of power to the generator but does represent a decrease in available capacity of the generator for producing power. Now, if a man is installing a generating plant and wishes at that generating plant to produce a thousand kilowatts in actual power, and if he at the time

(Testimony of H. L. Wollenberg.)

he is installing that generating plant realizes the fact that the load which he will put upon that generating plant will consist largely of inductive motors and other apparatus which inherently have a power factor, he will take that into consideration in buying his generator. For example: The Treadwell Company in installing a generator at Sheep Creek appreciated the fact that their motor loads and other loads would have a power factor. They anticipated that that power factor would be 85 per cent. They, therefore, buy a generator which could produce 100 kilowatts in current.

Q. (By Mr. J. HELLENTHAL.) Just a moment, Mr. Wollenberg. Are you testifying from information or things that you know?

A. I am testifying as to what—

Mr. SHACKLEFORD.—Just a moment. I believe that, if your Honor please, the gentleman has an opportunity to cross-examine; the witness has qualified and I am asking him this question.

Mr. J. HELLENTHAL.—Not qualified to talk about things he does not know anything about.  
[241—174]

The COURT.—I think it is all right, by the way of illustration. It is your privilege to cross-examine the illustration as to how correct.

A. (By the WITNESS.) Anticipating that his power factor will be 85 per cent, he buys a machine which is capable of an output of 1,140 kilovolt-amperes—by that I mean to say when that machine is fully loaded the multiple of the amperes on the ma-



(Testimony of H. L. Wollenberg.)

chine by the volts will equal 1,140, whereas the real power will be 1,000. Now that machine, of course, is accompanied with certain guarantees as to the rise in temperature under safe loads and these guarantees will be then the safe temperature. Now, in case the owner of that machine should find that he has more water than is necessary to develop 1,000 kilowatts on that machine he could, by adding the water—always by adding more prime motive power—develop 1,140 kilowatts, or whatever that estimate is, if his load is unity power factor load because with a unity power factor load the number of amperes is less and the capacity of the generator is entirely controlled by the number of amperes it produces independent of the power factor. Now in addition to that, if the owner of the generating plant was also the owner of the transmission lines and all the system connected therewith, he suffers losses on his transmission lines and losses and disturbances in regulation through having a lower power factor. Therefore, if he himself is the owner of the generating plant it would be to his advantage [242—175] to use any device available for increasing the power factor of his system, especially if he has more prime motive force in the way of water, or whatever drives his generator, so he can use the increased capacity of such generator, and he is also a gainer by the reduction of the losses on his transmission line. Now, where the generator is owned by one party and he sells power to another party and the transmission line belongs to the owner of the generator, in other words, the ordi-



(Testimony of H. L. Wollenberg.)

nary power situation—in that instance it is the power company who tries to derive benefits from the raising of the power factor, and they derive benefit to such an extent that it is not uncommon for a power company to place a synchronous motor running in such a way that it acts to raise the power factor on the line at its own expense because the benefit is entirely to the owners of the generating plant and not to the owners of the consuming plant. Now, in the case of a mining company, it would make no difference whether a mining company is generating their own power or buying it—if a mining company were buying power, electric power, on any ordinary basis, such as wattmeter measurement of some sort, they would have no advantage—they would have no advantage and would not ordinarily install a synchronous motor for any of their work, for the reason that the synchronous motor is very much more expensive, is a very delicate machine to operate, and there are no advantages particularly given to them by the operation. [243—176]

Q. The use of the inductive motor as distinguished from the synchronous motor, however, does not mean a loss of power, does it, Mr. Wollenberg?

A. No, it does not.

Q. The use of a synchronous motor means that under certain conditions machines capable of a certain production may have their amperage increased, that is, the generating plant?

A. The generating plant, exactly.

Q. I think there was—there was some sections in

(Testimony of H. L. Wollenberg.)

that Foster shown yesterday to Mr. Thane—I wish you would explain the application of those rules to the Court.

A. Yes. I think that the rule referred to is No. 74a, on page 506.

Q. Of Foster?

A. Of Foster. Shall I read the rule?

Q. Yes, go ahead and read it and then explain it.

A. Now, this rule occurs in the extract of standardized rules of the America Institute under the chapter headed “PERFORMANCE SPECIFICATIONS AND TESTS,” and under the sub-heading of “Rating,” paragraph “74a. POWER FACTOR. Alternating current apparatus should be rated in kilowatts, at one hundred per cent power factor; that is, with current in phase with terminal voltage, unless a phase displacement is inherent in the apparatus, or is specified. If a power factor other than one hundred per cent. is specified, the rating should be expressed in kilovolt-amperes and power factor, at rated load.” Now the significance of that chapter is this, first of all it applies to the rating of machines—in no sense [244—177] to the measurement of the power. It applies to a standardization of the manufacturer’s practice in rating machines which he offers for sale. It covers the situation that where a generator is built and we will say it is a small sized generator—built just to be put in stock and sold to some man who comes along and wants it—now, at the time that generator is built it is not known whether it will be used on systems consisting of elec-

(Testimony of H. L. Wollenberg.)

tric lights or motors or anything else, therefore, at the time it is built no power factor can be anticipated on the line upon which it is to be run, therefore the American Institute adopt a standard rule that they will rate a machine at 100 per cent power factor and rate it in kilovolt-amperes if any power factor is specified. Now, the significant thing is they will not rate it in kilowatts if it is to be used on a load where power factor is inherent in the amperage—and the difference of kilowatts and kilovolt-amperes is just a difference between the true power and the apparent power.

Q. Now, Mr. Wollenberg, if a properly adjusted wattmeter were set in the connection of the defendants' power line with the power line of plaintiff at Sheep Creek power-house, would you be able to tell, providing that was a correct meter, what power you were actually taking at that place?

A. You would.

Q. That is, it wouldn't relate to power received anywhere else—it would measure the power actually received at that point? A. It would. [245—178].

Q. Do you know of any other way of measuring that power?

A. No, I do not know of any other practical way of measuring that power.

Q. Do you know of any way in which the use and enjoyment of a current of 300 horse-power can be secured without the use of a wattmeter and without the use of a sufficient surge to start the ordinary machinery on the line so as to give it a consumption of

(Testimony of H. L. Wollenberg.)

300 horse-power?

A. The machinery now on the line?

Q. Yes, sir? A. I do not.

Q. Outside of the defendant companies' installing a separate generator of a capacity of 300 horse-power, do you know of any way at present of the defendant companies giving to the plaintiff an uninterrupted current—outside of the installation of an uninterrupted current of exactly 300 horse-power—outside of the installation by the defendant companies of a separate generator?

A. I know no device that would do it.

Q. That device would accomplish that purpose?

A. What device do you mean?

A. A separate generator of an actual capacity of 300 horse-power?

A. Yes, a separate generator would accomplish the purpose.

Q. Otherwise no practical benefit of the current—of the use of the current described in the complaint can be [246—179] derived with the ordinary machinery on that line except by the use of a starting surge? A. That is correct.

Q. O, I will ask you, Mr. Wollenberg, so that it is stated to the Court—set aside for a moment the idea of forcing the defendants to give a continuous or uninterrupted current by a separate generator—I will ask you to state to the Court what would be necessary as a practical matter in electrical operations to give a practical and beneficial use of the power contracted for—in the way of apparatus at the

(Testimony of H. L. Wollenberg.)

connection of the plaintiff with the defendant companies?

A. The only practical way that I see that they can give the equivalent of an uninterrupted current is to place on their feeder line a circuit-breaker set for the protection of our generating apparatus but not set for the instantaneous breaking of our circuit. It—they could then place a curve-reading wattmeter on the circuit which would indicate not only all the instantaneous amount of power going over their line but the summation of those and the total power on the line—give a complete record; and then if the plaintiff company exceeds its 300 horse-power and such was indicated by the wattmeter, if they exceeded it for any length of time, the circuit-breaker might be used as a means of notifying them that they were exceeding it, but such circuit-breaker, if one be used at all, should have a time element factor which would allow the starting of the machinery to consume the power after it is running.

Q. While it is impracticable for a man to sit and observe [247—180] a wattmeter, it would be very easy to adopt a system of taking readings at whatever intervals the defendant companies desired for their own protection against any practical inroads on their power, wouldn't it? A. Exactly.

Q. Just describe to the Court, Mr. Wollenberg, what your practice would be in arriving at the proper setting on such a circuit-breaker.

The COURT.—That is to give 300 horse-power, I suppose?



(Testimony of H. L. Wollenberg.)

Mr. SHACKLEFORD.—Yes, to give an uninterrupted—

A. You mean, do you not, to give a power which under the circumstances is a practical equivalent of an uninterrupted current of 300 horse-power?

Q. Yes.

A. Well, I should say that that circuit-breaker should be set, by an observation upon an ammeter and a wattmeter at times when the load was at 300 horse-power or its equivalent, and that would give the amperes necessary to give 300 horse-power, and by doing this a continuous power factor would be provided—be nearly enough constant, so by making a number of such determinations you could get the average amperage necessary or the maximum amperage necessary for delivering 300 horse-power, and then could take and set the circuit-breaker according to it by actual readings on the panel controlling the feeder.

Q. Well, if such a practice as that was adopted, Mr. Wollenberg, the results on the average would be that [248—181] we would draw less than 300 horse-power, wouldn't it?

A. Yes. I know of no way that we could load that line right up to the limit continuously.

Q. And that margin of safety which is necessary to hold below the 300 horse-power would be a margin that would amply compensate for any surge such as you may consider absolutely necessary for a starting surge? A. Very much more than compensate.

Mr. SHACKLEFORD.—That is all.

(Testimony of H. L. Wollenberg.)

Q. (By the COURT.) What margin is necessary for safety—what margin do you refer to?

Q. (By Mr. SHACKLEFORD.) I will ask the witness a further question. I referred, Mr. Wollenberg, to the margin which you must necessarily in your operations allow so as to keep below the 300 horse-power? A. Well, your Honor,—

Q. Just explain that.

A. We would put such motors on that machine that their normal rating at their normal load would not overdraw that amount. Well, now, in any operation there are many times during the day and frequently longer period when these different machines are not on the line at all. Whatever machines we put on that line we would have to put at their maximum, but under the 300 horse-power. Now, there would be a good many times during the day when we will have a light load on that 300 horse-power—would be a good many hours during the day when that load would be off the line. Now, as I explained before, we would only see what that load calls for and everything that we don't receive is on their bus-bars, which puts it on their [249—182] system—which puts it into use at their property.

Cross-examination.

Q. (By Mr. J. HELLENTHAL.) Well, Mr. Wollenberg, where did you ever see any such scheme for the measurement of power installed that you have been urging here—did you ever see anybody measure power that way? A. With a wattmeter?

Q. With a wattmeter and by setting an ammeter.

(Testimony of H. L. Wollenberg.)

or by putting it in and out and doing as you say you have?

A. I have never seen power measured in any other way than with a wattmeter.

Q. Where have you ever seen it measured in the way you have here indicated?

A. Mr. Hellenthal, I indicated only that it would be measured by the wattmeter because a circuit-breaker does not measure power.

Q. Did you ever see anyone install a wattmeter and install a circuit-breaker and change it up and down as you have indicated it, up and down?

A. I have not.

Q. Now, Mr. Wollenberg, a generator generates amperes and voltage; is that not true?

A. It generates a current which has those characteristics.

Q. Amperage and voltage?

A. Those are functions of the current which it generates.

Q. Amperage and voltage—a watt is a unit of electric power? A. It is.

Q. A watt is a volt times an ampere, is it not? [250—183] A. Only the direct measurement.

Q. Now, Mr. Wollenberg, we will get to that pretty soon—a watt is a volt times an ampere, is it not, when not considering power factor?

A. It is in case of direct currents.

Q. All right, have it that way. A watt is a volt times an ampere?

A. In case of direct currents it is.

(Testimony of H. L. Wollenberg.)

Q. Mr. Wollenberg, is it not in case of an indirect current?     A. You mean an alternating current?

Q. Alternating current?

A. It is in case of alternating currents, it is equal to a volt times the ampere times the power factor and certain constants which the phase of the currents—

Q. Now, listen. A generating plant generates volts and amperes, nothing else; isn't that true?

A. Quite true.

Q. Volts and amperes together with to a certain extent undeveloped power, do they not—power in the potential, is that not true?

A. I don't know of any such thing as power in potential.

Q. You know of such a thing as power undeveloped?

A. Yes, water running down a hill is undeveloped power.

Q. How about an electric current flowing in the wire, is that undeveloped power?     A. It is not.

Q. What is it—developed power? [251—184]

A. It is a current, only flows through that line in accordance with its consumption, either through loads or resistance on that wire and loads attached to that wire. There isn't such a thing as putting a bunch of amperes and volts out on the end of a wire and considering it so much undeveloped power.

Q. Volts and amperes—amperes impressed with a certain voltage on the bus-bar, you mean to tell me now, is not undeveloped power?     A. I do, yes.

(Testimony of H. L. Wollenberg.)

Q. What is it?

A. It is—it represents power that is being consumed somewhere else in that circuit, it is not being stored and if the generator was producing so many amperes of such and such a voltage that that current is being absorbed somewhere else.

Q. Why certainly?

A. It cannot be held at a point, as you mention it, as a potential power.

Q. At the instant now on the generation of volts and amperes are not these volts and amperes undeveloped power? A. They are not.

Q. What are they—are they developed power?

A. They represent the volts and amperes, represent the measurement of a current; the measurement of a current.

Q. Exactly?

A. Those are those two functions—those volts and [252—185] amperes in a case of alternating current times power factor, but in the simple case of direct current it represents a current which is being used up which is phase times volts; volts and amperes.

Q. How can you say it is being used up, it isn't necessarily being used in horse-power. It may flow off into the ground?

A. Then it is being converted into heat, which is a definite equivalent of horse-power. The energy is in some form.

Q. The energy is not converted into power but simply passes through the wire; is that not true?

A. Well, put your question.



(Testimony of H. L. Wollenberg.)

Q. In case your current running off a wire into the ground that current passes through the wire notwithstanding the fact that it is not being developed into horse-power, does it not?     A. Yes.

Q. What is that current if it isn't undeveloped power?     A. It is power.

Q. It is power?     A. Yes; it is power.

Q. But it isn't developed into horse-power, it is?

A. Certainly it is developed into an equivalent of horse-power, which is heat. Understand, Mr. Hellenthal, in the case you have mentioned, the ground simply completes the—the ground completes the circuit and it has a resistance loss in there which is converted into heat. You can't have an electric—an electric circuit is a circuit, must be complete, and along that circuit are necessary conversions [253—186] into power which consume the current, that is consume the energy of the current.

Q. All right. Well, now, when you install a motor you develop the electric current produced at your generating plant into horse-power, do you not?

A. You do.

Q. The electric current produced at the generator is not developed into horse-power until you install your motors and use it for that purpose, is it?

A. No, it—no, it isn't.

Q. Then until it is developed it is undeveloped, isn't it?

A. It is not produced until it is developed. It isn't produced until—

Q. A generator that runs—

(Testimony of H. L. Wollenberg.)

A. A generator can run if it has a closed circuit and it doesn't make any difference where that circuit is, whether the motors or any other resistance on it which has a power consumption, if you run a motor—without closing the circuit somewhere you don't generate any current.

Q. All right. In taking your current—in generating your current and taking it off your wires to utilize it in your motor and developing it into horsepower, there is a certain loss, Mr. Wollenberg, I understand? A. There is.

Q. And that loss is quite a power factor?

A. It is not.

Q. What is it called?

A. It is called the—it is the summation of a number [254—187] of losses, transformer losses, light losses, motor deficiency losses—

Q. I am not speaking of line losses—leave those out.

A. All right; there is motor deficiency loss.

Q. Well, leave that out.

A. Well, if you leave all the losses out you haven't any losses left.

Q. You mean to tell me that a motor can develop the same horse-power that is developed at the generator? A. No.

Q. No?

A. No. But you said to leave out line losses and motor deficiency losses.

Q. Leave out line losses, transformer losses and motor deficiency losses; then, can you operate the

(Testimony of H. L. Wollenberg.)

same power as the generator?

A. Leaving out all losses between the generator and the motor, assuming that no losses exist between the generator and the motor, there are no losses. That is an answer to your question.

Q. If there are no losses, there are no losses. That is not what I am trying to get at.

A. I know, you are trying to make me admit that power factor is a deficiency loss.

Q. No, I am not asking you—

A. That is what you are trying to get.

The COURT.—Evidently a misunderstanding.

Q. (By Mr. J. HELLENTHAL.) Isn't power factor the difference between the power generated and the power utilized or developed?

A. It is not. [225—188]

Q. Now, what is a power factor?

A. The power factor—

Q. Never mind about your book?

A. —the power factor is the ratio between the real power and the apparent.

Q. Well, now, I will change that wording—is it—the power factor is the ratio between the power produced at the generating plant and the power developed or utilized?

A. It is not. It is the ratio between the real power developed at the generating plant and the apparent power indicated at your generating plant by your ammeter and voltmeter readings.

Q. Now, what do you mean by apparent power?

A. I mean by apparent power the power that

(Testimony of H. L. Wollenberg.)

would be obtained by a simple multiplication of the readings of the indicating instrument, indicating ammeters and voltmeters.

Q. What do you mean by apparent power, actual developed power, and by real power—the useful power that can be obtained? A. Absolutely not.

Q. Now, what do you mean by real power?

A. I mean the power available for the performance of useful work—real power.

Q. Yes—power available for the performance of useful work? A. Yes.

Q. By apparent power, what do you mean?

A. I mean by apparent power that apparently is available by the reading of the indicating ammeter and voltmeter. [256—189]

Q. You mean by apparent power the power that apparently is available for the performance of useful work, and by real power the power that is actually available; isn't that true?

A. Yes; but I will correct it to a certain extent; real power is the power actually being consumed, not only available, but actually being consumed.

Q. Actually being produced?

A. Actually being consumed.

Q. By consumed you mean produced?

A. Do not. I mean by consumed, consumed. It is a simple English word.

Q. Quite so. When you say consumed do you mean to say that the power consumed is the same as the power produced? A. Absolutely.

Q. Absolutely?

(Testimony of H. L. Wollenberg.)

A. Absolutely. Using it by consumption in line losses, motor losses, or anything else. The fundamental principle of conservation of energy answers your question. The power consumed is equal to the power produced.

Q. Now, power produced or capable of being produced from a given number of amperes at a fixed or given voltage depends upon the manner and means in which it is consumed, does it not, Mr. Wollenberg?

A. No, it depends rather on the—on the question of whether they are in phase with each other—if the amperes and volts being produced are in phase with each other; in other words, if the current has unity [257—190] power factor they will produce a certain amount of current; if those amperes and volts being produced are not in phase with each other,—in other words, if not unity power factor but something else, they will produce a less amount of power. Now, understand, Mr. Hellenthal, a generator does not produce an ampere, or a certain voltage—with a certain voltage until the circuit is closed and some call comes on that generator to take that current. Now, if the call on that generator is for an inductive load, that generator produces an ampere which is not in phase with the voltage; and if a call comes on the generator from a system of unity power factor, then that generator produces a current in which the amperes and the volts are in phase with each other.

Q. Now, let's get back to where we were talking about.

A. The generator does not of itself produce am-



(Testimony of H. L. Wollenberg.)

peres which are in phase with the voltage unless the load that calls upon that generator is that ordinarily required in that kind of current, it doesn't produce it and then become converted, but the motor in producing it—it conforms—the motor—is the system—it is a circuit—the conditions that prevail are influenced by everything on that circuit. There isn't a distinct power factor at a certain place on the generator and taken from that place by the motor—it is a circuit.

Q. All right. Let's get back to where we were talking. We will just put it this way so you understand just what we mean, Mr. Wollenberg. The power factor in [258—191] any given case depends upon the use to which the power or the electricity is applied, does it not? A. That is true.

Q. That is true. In case of a form K motor such as you are using at Sheep Creek, there is a certain power factor, is there not?

Q. You mean a certain common constant power factor?

Q. No, it isn't constant?

A. It has a power factor. It is inherent in that make of machine.

Q. It has a power factor inherent in that make of machine? A. Yes.

Q. The power factor in one form K motor only differs probably from the power factor in other form K motors slightly?

A. Slightly. Well, the power factor in any one machine differs a little whether the machine is fully

(Testimony of H. L. Wollenberg.)

loaded or partly loaded.

Q. The power factor in the machine varies at different hours even during the day and evening, different moments, depending on the load placed upon the machine? A. Exactly.

Q. When the machine is loaded heavily the power factor is light, when the power factor is—

A. The machine has its highest power factor at its normal rating. If a 200 horse-power motor it has its highest power factor when producing 200 horse-power, and at less loads and overloads it falls off.

Q. The power factor gets less?

A. Yes. [259—192]

Q. Machines will not often run just at their normal rating but will run either above or below that in actual practice? A. In actual practice; yes.

Q. In actual practice the power factor on a machine varies every moment during the day as the load on the machine increases or decreases?

A. If it has a varied load, that is true.

Q. Again, the power factor inherent in different forms of motors also varies, does it not, Mr. Wollenberg? A. It does.

Q. The power factor inherent in a form M or form P motor is very different from the power factor inherent in a form K motor? A. No.

Q. How much difference?

A. Why, of course, it is a hard question to answer, because a form K motor of different size will vary some in their power factors, but ordinarily the best makes of inductive motors are about 85 per cent

(Testimony of H. L. Wollenberg.)

power factor at their—at and around their normal rating, and a form M and form P and form K are all inductive motors and different at the starting place and rather than in any material difference after they are operating.

Q. Now, your form K motor you are now operating has about 70 per cent power factor?

A. No, the whole system which we are now operating has about 70 per cent power factor.

Q. This includes the lighting?

A. Includes the lights. [260—193]

Q. The lights on the plant however would not have any power factor at all?

A. Yes, they have unity power factor.

Q. Unity power factor? A. Yes.

Q. Well, that is 100 per cent power factor?

A. Yes, but it is a power factor just the same.

Q. So your lights and your motor being on the line, you have no other load on the line?

A. Well, the lights themselves have an inductive effect and transformers have an inductive effect, all of which lowers the power factor.

Q. All of which lowers the power factor?

A. I mean lowers it below unity; they all have power factor.

Q. You do not consider that the line losses and transformer losses enter into the power factor, do you? A. Yes, I do.

Q. Well, those losses—

A. I don't mean the transformer—if I understand

(Testimony of H. L. Wollenberg.)

your question: do the transformers influence the power factor?

Q. Yes.      A. They do very materially.

Q. They do influence the motor power? Then the question of whether you have one or two transformers on your line would either increase or decrease the power factor?      A. It would.

Q. The more transformers you have on your line the less would be the power factor?

A. No, that isn't true. The power factor of transformers [261—194] varies considerably according to their loading and at high loads—at full loads their power factor is high and at low loads it is low. So it is a very big question.

Q. It is a question as to what the power factor would be.

A. That question with reference to transformers.

Q. Yet they would affect the power factor, is that true?      A. Yes.

Q. It is quite a mooted question as to how your transformers will affect the power factor?

A. Oh, no; no doubt about it at all. It is an established fact that transformers affect power factor, but I say the effect—as to what their effect is depends upon the load on it, so to speak, it varies just the same as the motors do.

Q. The effect of the transformers upon the power factor would also depend on the number of transformers in use?      A. Yes.

Q. The greater the number of transformers in use the greater the effect?      A. Yes.

(Testimony of H. L. Wollenberg.)

Q. Again, you say the power factor is also affected by your line? A. Yes.

Q. How does that affect it?

A. How does that affect it?

Q. How does it occur?

A. Well, it occurs from the line of itself having a certain inductive capacity and it would be a function in the line. [262—195]

Q. The longer the line the greater the effect upon the power factor? A. Correct.

Q. How does the length of line affect the power factor, Mr. Wollenberg?

A. The greater length of line—

Q. The greater power factor?

A. No, the less.

Q. The less the power factor. So the shorter your line your power factor would be greater, and as you lengthen out your power factor would be less; is that correct? A. That is correct.

Q. Those are all elements that enter into the determination of what the power factor should be in any given case? A. Yes.

Q. If you were to install a lighting plant the power factor would be unity?

A. Well, nearly so; would be transformers on that, probably, and line inductive effects that would bring it below unity.

Q. Well, leaving out the effect of the transformers? A. The load itself is unity.

Q. The same is true of a synchronous motor?

A. A synchronous motor would be operated to have



(Testimony of H. L. Wollenberg.)

a power factor of one and a half.

Q. Which is practical?

A. No, unity is uncommon. I say a synchronous motor can be—well, hardly at one and a half—but say above unity.

Q. Above unity?

A. A synchronous motor in operation is practically within [263—196] the control of the man running and is a power factor—

Q. The installation of a synchronous motor then puts the party operating it in such a position that he can get more than 100 per cent power factor?

A. Yes.

Q. Can you get more than 100 per cent useful power out of 100 per cent apparent power?

A. No.

Mr. SHACKLEFORD.—Just a moment. Repeat that.

Mr. J. HELLENTHAL.—I didn't mean to say he could—get more useful power than he has apparent power; that is what I mean.

A. If it was so arranged as to bring the power factor above unity, why I can get more useful power than apparent power. That is correct. I don't think that has much practical operation, but it could be done—it is correct; yes.

Q. Are there any other forms of motor in use to which—are there or are there not, Mr. Wollenberg, a large number of other forms of motors that can be used in connection with the development of horse-

(Testimony of H. L. Wollenberg.)

power other than those of which we have been speaking?

A. Yes; we have been speaking of the form K and form P and a lot of designations which are exclusively those of the General Electric Company. There are many other motors made by other concerns and differently designated but of the same type.  
[264—197]

Q. All of these various motors—any number of motors—each motor has its own power factor when installed and operating, does it not? A. Yes.

Q. And the power factor in each one of these motors differs from the power factor in each other of the motors?

A. Well, two motors made by the same manufacturer while not the identical—built in the same manner will have the same characteristics, of course.

Q. But even at that they wouldn't have exactly the same power factor?

A. *The* would under the same conditions—two identical motors under identically the same conditions would have the same power factor.

Q. Do you know of any identical motors running?

A. Well, you know that if you are going to ask me foolish questions, that two things cannot exist in nature that are identical, but, if you are speaking in practical terms, two identical motors are very probable and continually built.

Q. Now, you say that the manner in which you measure this power at Sheep Creek would be by means of a wattmeter. A. I do.

(Testimony of H. L. Wollenberg.)

Q. Now, the wattmeter takes automatically into consideration the power factor, does it not?

A. It does.

Q. It shows you how much horse-power is actually developed from the current in use—that is what it does, doesn't it? [265—198]

A. Yes, actually consumed.

Q. In the case of a form K wattmeter—form K motor, the wattmeter would show the horse-power actually developed from a given current by that motor? A. In any case—

Q. The same in the case of any other kind of a motor, synchronous motor or any other?

A. Exactly; any kind of a motor, whatever that may be.

Q. If you were to install a synchronous motor—we will not develop the synchronous motor above the power factor but, say, operated at unity power factor, the wattmeter if installed at Sheep Creek, if it were to indicate 300 horse-power and then sent a man there—you were then to read. Let me get that question; I am getting it too involved. If we were to involve—if you were to install a synchronous motor—

A. Where?

Q. At Sheep Creek, we will say somewhere on that line of unity power factor that had a power factor and a wattmeter were installed to measure your power and you stood by and waited until the wattmeter read 300 horse-power and you then went to your ammeter to see how that read, the voltage being 2,300, the ammeter would read 56 amperes, would it

(Testimony of H. L. Wollenberg.)

not? A. That is correct.

Q. That is correct, is it not? A. That is correct.

Q. Then if you were operating the plant for the defendant companies and the Alaska-Perseverance Company, or the Gastineau Company, or whatever it is—the plaintiff company were operating with a synchronous motor, you [266—199] would then place your circuit-breaker at 56, would you not?

A. If I were operating the defendants' plant?

Q. Yes, and you were working it according to the method that you have been trying to tell us about?

A. Yes, I would place the time relay circuit-breaker at 56 amperes.

Q. You intend to put in a time relay circuit-breaker—your circuit-breaker, whatever circuit-breaker you might use you would place at 56 amperes?

A. If such circuit-breaker would open the circuit at 300 horse-power, if that is the limit, I would place it at 56 amperes under the conditions you have described.

Q. If the plaintiff company were using a light load and you were drawing 300 horse-power and you went to your wattmeter, you would find that the wattmeter when it read 300 horse-power or the equivalent in watts of 300 horse-power, it is 224, isn't it?

A. Yes.

Q. 224. You would then find that your ammeter would read 56, as in the case of a synchronous motor, wouldn't you?

A. Not unless all those lights were closed down at

(Testimony of H. L. Wollenberg.)

Sheep Creek in one place and right at the power plant—

Q. Well, assuming there are no line losses—

Mr. SHACKLEFORD.—Just a moment. I object to counsel interrupting the witness when he is starting to answer a question.

Mr. J. HELLENTHAL.—I object to counsel butting in.

The COURT.—Both objections sustained. [267—200]

A. (By the WITNESS.) The only way that the ammeter would read 56 would be that these lights were all down there at that power-house where they would be of no use to anybody, because if those lights were at any other useful place the power factor would be less than unity (56), because although the lighting itself has a power factor of unity the line and other factors necessary—transformers—would lower that power factor below unity. The only case that ammeter would read 56 in case 300 horse-power going over would be in the case of the lights right down there at the power-house and no line losses.

Q. (By Mr. HELLENTHAL.) We are assuming there is no line loss.

A. I am not speaking of line loss; there is the inductive factor of the line which lowers the power factor. There are two distinct things.

Q. All right, we will say that the lights were used at the power-house, at the place where the power is, here at the power-house, then the power factor would be unity, would it not?



(Testimony of H. L. Wollenberg.)

A. Well, if you can get a light to burn on 2,300 volts, you would have to put some transformers in to use that available light and that would probably affect the power factor.

Q. Assuming you could get a light to burn on 2,300 volts—

A. Assuming that you could get a light to burn on 2,300 volts and put the lights there in a cluster where no inductive effect on the power factor—the power factor would be unity.

Q. And then if your lights were so installed and you [268—201] could have that and the equivalent of 300 horse-power were being furnished from the bus-bars— A. Correct.

Q. —then you would set the circuit-breaker at 56?

A. That is set at 56 if it were the intention to have it open at 300 horse-power.

Q. Exactly. Now, suppose these lights are turned away from Sheep Creek and turned to Juneau, it would then not have unity power factor, would it?

A. No.

Q. The power factor would be something less than unity? A. It would.

Q. Then if 300—if the equivalent of 300 horse-power would be drawn from the line as indicated upon the wattmeter, you would find the ammeter something above 56, probably 58, 59 or 60?

A. I don't attempt to say what its amount would be—something above—

Q. O, no, but something above? A. Yes.

Q. You would then set your ammeter to correspond

(Testimony of H. L. Wollenberg.)

with that, or your circuit-breaker I mean, to correspond with that reading of the ammeter?

A. I would if I were attempting to set the circuit-breaker to open at 300 horse-power.

Q. 300 horse-power—and that 300 horse-power you would consume—is that correct?

A. That is correct.

Q. Then if the electric lighting current were transferred from Juneau to Skagway, the power factor would [269—202] be very much greater, would it not, the line being longer? A. You mean lower?

Q. Very much less, isn't that true?

A. Yes, that is correct.

Q. Then if you set that wattmeter in your power-house—found that your consumer was drawing an equivalent of 300 horse-power you would find that your ammeter would probably register 65 or 70, about where it did on the previous occasion, would you not?

A. Yes.

Q. Then you would readjust your circuit-breaker, of course, your purpose being to set your circuit-breaker so it would go out if more than 300 horse-power were drawn, you would then readjust your circuit-breaker to correspond with that reading of the ammeter? A. I would.

Q. Then if your consumer discontinued the power of the electric lights and went to using a form K motor, as you are now using at the Perseverance—cut out some electric lights so that the power factor would be again changed, you would again go to your wattmeter, find out whether the equivalent of 300

(Testimony of H. L. Wollenberg.)

horse-power was being drawn, wouldn't you?

A. Yes, I would.

Q. Then you would find that the amperage had increased materially, wouldn't you?

A. It would have, yes.

Q. Probably 80-odd amperes?

A. I would not venture an opinion on the subject.

[270—203]

Q. Well, I say, it would have increased?

A. It would have increased.

Q. You can't, of course, tell what it would be upon the power factor? A. I suppose it is.

Q. Mr. Wollenberg, you can't tell what it would be because the power factor would go up?

A. The conditions you have described—no, no; can't say what the power factor would be.

Q. No, of course you can't say what it would be, but it would be greater? A. Yes, certainly.

Q. I mean less? A. Less.

Q. Now, then, would you again readjust your circuit-breaker to correspond with the reading of your ammeter, which would on that occasion probably be 80 or some figure, would you not, Mr. Wollenberg?

A. Depending if the purpose were to get from the circuit-breaker—

Q. If more than 300 horse-power were drawn whenever your consumer would change the use to which his power was being put from one thing to another, whether it be from lighting to an inductive motor, from an inductive motor to a synchronous motor or from one motor to another form of motor,

(Testimony of H. L. Wollenberg.)

the power factor would change, would it not?

A. Yes, it would.

Q. And every time that the power factor would change you would go to your wattmeter and read your wattmeter, [271—204] determining whether he was taking 300 horse-power and read your ammeter to determine how much amperage was being consumed, and then set your circuit-breaker accordingly; is that it?

A. I would, if the purpose were to set the circuit-breaker, were to allow 300 horse-power on that surge.

Q. The amperage on that—assuming now that all these questions, Mr. Wollenberg, that the voltage remained the same? A. Yes.

Q. —no use of naming the voltage because it is always constant at Sheep Creek?

A. No; it is not.

Q. Supposed to be kept at a certain voltage?

A. But it is not.

Q. Well, as near as can be done?

A. Yes; the attempt is made but it varies materially.

Q. How much?

A. Well, I have seen charts down there on which a written record is made daily, which shows some peculiar variations in percentage.

Q. You don't know whether—that is, whether it goes below 2,300?

A. I could not say as to the exact amount, I only know that these charts which show the voltage allowed a consumer would show a straight line. If any

(Testimony of H. L. Wollenberg.)

variations come on the plant are inclined to go up and down.

Q. That is the case with every—

A. Practically; yes.

Q. Leaving that out and assuming a constant voltage, now we will assume it may be 2,300 or 2,400, the [272—205] amperage, that is to say, the flow of current would be increased or diminished each time that the use to which the power was applied was changed from one use to another, would it not?

A. If that use involves the use of a power factor it would.

Q. Exactly?      A. It would.

Q. If the plaintiff company were using a synchronous motor at unity power factor, the amperage would be 56?

A. If such a synchronous motor were located at the Sheep Creek plant?      Q. Yes.

A. —showing that no other inductive loads occurred?

Q. So that the power factor would be unity?

A. So that the power factor, not of the main circuit, but of that motor, should be unity.

Q. Now, if the use to which the power was applied switched to some motor or some other machine or whatever they would, that they had a power factor of 50 per cent, the amperage would be twice 56, or 120, would it not?      A. It would.

Q. That is to say the actual quantity of electric current taken from the bus-bars would be double, would it not?



(Testimony of H. L. Wollenberg.)

A. What do you mean by amount of current?

Q. The actual amount of amperes and volts?

A. No, the actual amount of amperes taken would be doubled.

Q. The volts remaining the same?      A. Yes.

[273—206]

Q. That is to say, the volts remaining the same, it would double the quantity of current, would it not?

A. What do you mean by quantity of current?

Q. Well, the volt times amperes?

A. Then you mean kilovolt-amperes?

Q. Kilovolt-amperes?

A. Yes, the number of kilovolt-amperes would be doubled, but the number of watts of real power would not be.

Q. No, that would remain the same?

A. Exactly.

Q. But the quantity of kilovolt-amperes would be doubled?      A. It would.

Q. Now, kilovolt-amperes are what the generating plant generates; is that not true?

A. That is not true, as a general statement.

Q. Well, let's get at it this way. Suppose we have a generating plant, Mr. Wollenberg, that has a capacity of 56 amperes and a voltage of 2,300, such a generating plant would generate sufficient power to operate—to furnish you with 300 horse-power at unity power factor, would it not?

A. If you say—repeat your question, please.

Q. If you have a generating plant that will generate 56 amperes impressed with a voltage of 2,300

(Testimony of H. L. Wollenberg.)

such generating plant would generate sufficient power to furnish you with 300 horse-power at unity power factor? A. It would.

The COURT.—We will adjourn to two o'clock.  
[274—207]

Two o'clock—Court reconvened.

The COURT.—You may proceed, gentlemen, with the case before the Court.

Q. (By Mr. J. HELLENTHAL.) Mr. Wollenberg, just before lunch I was asking you this question: If a generating plant had a capacity of 300 horse-power, assuming the power factor to be unity, you understand, you would take all the power generated at that plant if you drew 300 horse-power at a unity power, would you not?

A. You would.

Q. Then, if the power factor was decreased to 50 per cent you would take twice the power generated at a plant of that size before you would be getting 300 horse-power,—is that true? A. Absolutely not.

Q. Not true? A. Absolutely not true.

Q. Now, explain to me why that is not true.

A. In case of a generator capable of producing 300 horse-power and under the necessary motive power—prime motive power for the production of that unity horse-power if supplying current to a circuit of unity power factor, it will require a definite number of amperes at a definite voltage. In the event of that same generator with that same amount of motive power, that same amount of motive power of water, merely enough prime motive power to furnish 300

(Testimony of H. L. Wollenberg.)

horse-power, in the event of that generator with that same amount of motive power to supply current to a circuit of 50 per cent [275—208] power factor it would still supply exactly 300-horse power. With that circuit—although the readings of the meters on the line would show a different amperage than they would in the previous case, but the output of power we would generate from the prime motive system, whether it be water or anything else—and the output of that generator in real power, whether it be in a current of one hundred per cent power *favor* or any other power factor, the power involved remains the same.

Q. Now, I don't think you quite understood me. Where the consumer increases the amperage by a decrease in the power factor the tax on the generator increases does it not?

A. What do you mean by tax?

Q. Well, the demands made upon the generator.

A. The demand for power made upon the generator remains constant.

Q. Do you mean to say, Mr. Wollenberg, that a generator having a capacity, just a sufficient capacity to furnish the electric current that would be drawn from the bus-bars by a consumer drawing 300 horse-power under a unity power factor would furnish the power drawn by a consumer if the power factor were decreased to 50 per cent—yes or no—do you mean to say that?

A. If you want me to answer, yes or no, you will have to define some of the words you use, which you

(Testimony of H. L. Wollenberg.)

use rather roughly.

Q. What do you want?

A. First place, I want to know what you mean by the [276—209] capacity of a generator of 300 horse-power?

Q. That is all a generator can generate?

A. All the power it can generate?

Q. All the power it can generate.

A. You can't let a generator use all the power it will generate and state it has horse-power—

Q. All right, we will get together. When you measure a generator? A. When you measure it?

Q. When you speak of a generator having 100 horse-power.

A. Well, just a moment, if I may interrupt you. Generators are not rated that way.

Q. How is the Sheep Creek generator rated?

A. O, it is rated in watts at a constant power factor.

Q. All right, that is the equivalent of certain amperes at a certain voltage, is it not?

A. It is the equivalent of a certain amperage at a certain voltage, at a certain power factor—at a certain power factor.

Q. All right; well, now, we will say that the power factor is unity, we are assuming a specific kind of generator now, on which the power factor we are assuming now is unity, you understand? A. Yes.

Q. It produces 300 horse-power as a unity power factor, that is to say it generates 56—we are speaking of 300 instead of 100 in order to keep this matter before you—we are generating 56 amperes at present

(Testimony of H. L. Wollenberg.)

with a voltage of 2,300; is that not true?

A. I have lost your question now. [277—210]

Q. Well, we are assuming now that the Sheep Creek generator—is much larger—we will assume it only has a capacity to generate 300 horse-power at a unity power factor, that it to say, has the capacity to generate 56 amperes impressed with a voltage of 2,300—we assume that—

A. By capacity you mean that you are to be within safe temperatures under these conditions—is that what you mean by capacity?

Q. Exactly. If the tax upon it is increased the temperature will become too increased to make it safe—you understand me now? A. Yes.

Q. Then if we reduce the power factor to 50 per cent—then if we reduce the power factor to 50 per cent? A. Yes.

Q. You don't mean to say that that generator will still furnish 300 horse-power?

A. It would still furnish 300 horse-power, so far as the motive power—the prime motive power needed or energy needed, but would then have amperage on it which would overheat it if it were only a safe temperature.

Q. Well, we will say will it produce it without overheating, that is what I am trying to get at—is that within its capacity?

A. You are taking 50 per cent power factor?

Q. Yes. A. Well, it— [278—211]

Q. It doubles the amperage?

A. It doubles the amperage and increases the heat-



(Testimony of H. L. Wollenberg.)

ing of the generator. Now, whether the generator will stand it or not is just a question of the particular generator or the manufacturer's agreement.

Q. We are assuming now that we have a generator running at absolutely its full capacity—I mean generating 300 horse-power at unity power factor.

A. O!

Q. Then you cannot take that same generator and generate 300 horse-power at 50 per cent?

A. Not without overheating.

Q. Not without overheating? A. No.

Q. No. You are doubling the tax on it?

A. You are doubling the flow of amperage in the generator.

Q. Well, that doubles the tax upon the generator, does it not? The demand you are making, a double demand you are making on the generator, are you not? A. Not as regards power.

Q. Well, I understand that, but as regards voltage and amperes?

A. No, as regards voltage—as regards amperage you are making a larger demand upon the generator.

Q. Well, the generator has got to generate twice as much, does it not, in the way of voltage and amperage?

A. No, not in the way of voltage and amperage.

Q. Well, the voltage remains the same but the amperage [279—212] has got to be doubled?

A. The amperage has got to be doubled.

Q. Yes. Now—assuming now, Mr. Wollenberg, that the Treadwell Company—the defendant com-

(Testimony of H. L. Wollenberg.)

panies here should install at Sheep Creek a proper motor for your use— A. You mean generator?

Q. —a proper generator having a capacity to generate 300 horse-power at unity power—having no greater capacity—you know what I mean by capacity—now that is the current you will produce?

A. Yes, with a safe temperature.

Q. Then it wont go anything higher, that is to say it will go if it goes any higher than that, it will burn it out. Now, you know what I am getting at—if it runs faster it will burn out?

A. It is not a question of running it faster.

Q. Well, if you make any greater demand upon it, understand it now?

A. Yes, it isn't a practical question.

Q. I don't care whether practical or not, answer my question. A. I will tell you—

Q. Now, if they installed such a generator and you reduced your power factor to 50 per cent the generator would be too small, wouldn't it?

A. It would.

Q. Yes. Now, if they installed a generator that would furnish you with the required amount of horse-power at 70 per cent, that would be the limit of its capacity at 70 per cent power factor, providing you [280—213] are now using it there to reduce it to 50 per cent—your generator would be too small, would it not—reducing it to anything below 70 per cent?

A. If previously taken just equal to that, it would be too small.

Q. Yes, then again, if you install this generator

(Testimony of H. L. Wollenberg.)

at 70 per cent and instead of reducing your factor to 50 or 60 you increased it to 90, we will say, the generator then would have a surplus of power, it would be capable of producing a surplus of power?

A. It would be capable of producing a surplus of amperage—power does not enter into that.

Q. I understand.

A. You keep referring to power instead of amperage.

Q. It would be capable of producing a surplus of amperage? A. It would.

Q. There would be water power injected into that machine that would go to waste? A. It would not.

Q. It would not go to waste? A. No.

Q. What would become of that surplus amperage?

A. That surplus does not represent power because it is the wattless component of your circuit, in other words, it is that amperage which is wattless or powerless because it is an apparent condition and does not represent power.

Q. I know, but you don't mean to tell me, Mr. Wollenberg, that the change it would make in the use to [281—214] which you put this power that would affect the power factor, a change in the motor would in no wise affect the flow of water down hill at Sheep Creek, as it goes into the generator, would it?

A. Affect the flow of the water?

Q. Yes, the water would flow just the same?

A. Certainly.

Q. Then if the water was only sufficient—if the water was sufficient to create the amperage required

(Testimony of H. L. Wollenberg.)

at 70 per cent there would be a surplus of water would flow through the generator, if the amperage was increased to 80 or 90 per cent; is that not true?

A. That is not true.

Q. What would become of the other water—would it stay up the hill there?

A. No, the water would continue to run. A definite amount of water applied to the water-wheels will generate a definite amount of power, horse-power. Your efficiencies, etc., stay the same. Now, that power, that definite power that is generated by a definite amount of water flowing down a definite hill, can be converted into a current of unity power factor in which it takes a certain number of amperes and a certain voltage to reach this definite amount of power; or that power can be converted by that generator into another current on another circuit in which the power factor is less than unity.

Q. Well, Mr. Wollenberg—

A. Let me finish, please. In fact, the power factor [282—215] is nearly unity where a larger number of amperes at the same voltage are required for the same power.

Q. Well, I am assuming, Mr. Wollenberg, that there are no other lines upon this circuit except yours?

A. That assumption carries; I would not contradict that in any wise. You are considering variations of power factor on the same circuit?

Q. I am considering variations of power factor on the same circuit. A. So am I.

(Testimony of H. L. Wollenberg.)

Q. Now, what effect would these variations of power factor upon the same circuit have upon the flow of water as it flows down the hill at Sheep Creek?

A. Have absolutely no effect on the flow of the water as it flows down hill at Sheep Creek.

The COURT.—Well, let's not waste time on foolish questions like that.

Q. (By Mr. J. HELLENTHAL.) All right, your Honor. Now, Mr. Wollenberg, is it not true that 300 horse-power at 19 per cent power factor would require in total output in amperes that can be safely furnished from one of the generators at the Sheep Creek plant?

A. I could not answer that without calculating.

Q. How long would it take you to calculate?

A. A few minutes.

Q. All right, calculate it.

A. If you will tell me the characteristics of the generator. [283—216]

Q. Ask me what you want to know, you are familiar with that generator?

A. I want to know what you are talking about, same thing.

Q. Is it not a fact that 300 horse-power at 19 per cent power factor would require the total output in amperes that could be safely furnished from one of the generators at the Sheep Creek plant?

A. Well, now, what is the rating of the Sheep Creek generator?

Q. What is the rating?



(Testimony of H. L. Wollenberg.)

A. (By E. P. KENNEDY.) 1175 kilowatts at 100 per cent power factor.

A. (By WITNESS.) 19, did you say?

Q. Yes, sir?

The COURT.—Now, before we go ahead, let us see if you understand the question before we go any farther, so we won't have to do any unnecessary figuring. Suppose you state it as you understand the question.

A. Well, I understand the question is this: Would 300 horse-power at 19 per cent power factor require the entire amperage output of one of the Sheep Creek generators?

Q. (By Mr. J. HELLENTHAL.) That is right?

A. What is the amperage rating of the Sheep Creek generator?

Q. 294 amperes?

A. Is that consistent with 1175?

Q. 2,300 volts? A. That is correct.

Q. Correct. Is it not a fact, if you take 9.5 per cent [284—217] power factor would require the total output in amperage from both of the generators of the Sheep Creek plant?

A. That is correct.

Q. Is it not a fact, assuming the output at Nugget Creek to be approximately 1100 and the output of the steam plants at Treadwell to be 2000, that at 4.5 per cent power factor it would require the total combined generator capacity in amperes of the Sheep Creek, Nugget Creek and Treadwell steam plants combined?

(Testimony of H. L. Wollenberg.)

Q. Yes, sir, generating capacity?  
ing capacity? A. Generating capacity?

A. You will read that question again, please?

Q. Assuming the capacity of the Nugget Creek plant to be 1100 and that the steam plant at Treadwell—combined steam plants to be 2000, would not the 300 horse-power at 4.5 per cent require the combined total output of the entire generating capacity in amperes of the Sheep Creek, Nugget Creek and Treadwell steam plants combined?

A. Well, I would have to make a calculation of that.

Q. Well, I don't care so much about that question. I will ask you this further question. It takes a little time to calculate. Is it not a fact, Mr. Wollenberg, that 300 horse-power at a one per cent power factor would require a generating capacity of 22,400 Kilowatts, or 19 such plants as are in use at Sheep Creek?

A. I would have to calculate that. You will have to repeat the conditions.

Q. Mr. Wollenberg, just before you answer the question as to the 19 generators—there are two generators at [285—218] Sheep Creek.

A. Well, do you ask me whether it would take the entire capacity of such plants there—did you ask me whether it would take the ampere capacity?

Q. Take the capacity of such a plant.

A. Well, that is an unanswerable question unless you can define the capacity in some way.

Q. What is capacity—ampere capacity, generat-

(Testimony of H. L. Wollenberg.)

A. You might as well ask the question so it can be answered. Now, you know that the generating capacity, if you mean power, is not the same thing as the ampere capacity. Now, tell me what you mean.

Q. I will read it right from this dope. Is it not a fact that 300 horse-power at one per cent power factor would require a generating capacity of 22,400 kilowatts or 19 such generators as are in use at the Sheep Creek plant?

A. If you use the word "generating capacity," I answer "No."

Q. You answer "No?"      A. Yes.

Q. (By the COURT.) If used amperage you would answer "Yes?"

A. No, I would figure it and then answer it either "Yes" or "No," as my calculation shows. There is an enormous distinction between generator capacity and amperage capacity.

Q. (By Mr. J. HELLENTHAL.) The entire generating capacity in amperes, we will put that in.      A. Yes, about 19.

Q. That is all right isn't it? [286—219]

A. Yes.

Q. Now, Mr. Wollenberg, in addition to adjusting your circuit-breaker so that it would not go out until 300 horse-power was drawn from the bus-bars as measured on a wattmeter which calculates and takes into consideration the power factor, you would instead of installing an instantaneous circuit-breaker, you would install a time relay circuit-

(Testimony of H. L. Wollenberg.)

breaker—is that it?

A. Well, you are asking me what I would do—what are the conditions?

Q. You told us this morning how we should regulate matters down at Sheep Creek?

A. I suggested a method.

Q. I am talking about your method?

A. Well, let me state what my method was. I suggested a method which in my opinion under the existing electric arrangements at Sheep Creek and on the lines of the defendant companies would satisfy as nearly as possible the conditions which the plaintiff company would enjoy if the contract were complied with and an uninterrupted current of 300 horse-power were delivered them. I simply offered an alternative arrangement which, under the existing conditions, might offer a practical way of fulfilling the spirit of the contract and the letter of the contract as regards the delivery of the 300 horse-power.

Q. According to your interpretation?

A. According to my interpretation.

Q. Now, I am asking you, according to your interpretation of the contract, for the same purposes that you have [287—220] mentioned, now in addition to establishing the wattmeter—

A. As the basis of measurement.

Q. —as the basis of measurement, and adjusting your circuit-breaker from time to time in such a manner that it would not go out until 300 horse-power were drawn as reported upon this wattmeter

(Testimony of H. L. Wollenberg.)

—now, wait until I get through my question—as reported upon this wattmeter, which takes into consideration the power factor, you would install, not an instantaneous circuit-breaker, but a time relay circuit-breaker; is that your method?

A. That is right.

Q. Now, the purpose of a time relay circuit-breaker is to enable the consumer for a short time, whichever time the time relay circuit-breaker is set, to draw a load in excess of the regular load; is that not true?

A. It enables him to draw an amperage in excess of the normal amperage, not necessarily a load.

Q. Well, amperage in excess?

A. That is a very strong distinction, and if you would stay with it we would not have so much trouble.

Q. Well, let us see about that distinction. When you draw an excess of amperage you decrease the amperage remaining for use by the Treadwell Company, do you not?

A. Not if that increased amperage is accompanied by a decreased power factor or a decrease in voltage.

Q. The voltage remaining the same?

A. Will then be a decreased power factor.

Q. How does the power factor enter into that matter? [288—221]

A. Because amperage at one power factor represents a different demand upon the generating capacity and upon the energy output of the genera-



(Testimony of H. L. Wollenberg.)

tor than it does at another power factor.

Q. Now, Mr. Wollenberg, you know, and know very well, that when you draw 80 amperes at 2,300 voltage you leave less available current for the use—for the defendant companies than you would when you draw 56 amperes at the same voltage, do you not? A. I know that is not so.

Q. That is not so? A. That is not so.

Q. The Treadwell Company can get the same power, the same working efficiency, when you draw 80 amperes at 2,300 voltage that they can when you draw 56; is that so?

A. You are assuming a constant source of prime motive power to the machine?

Q. I am assuming the motive power of the machine does not affect it at all?

A. I beg your pardon; the machine is producing with a given amount of water a given amount of power. Now, as we draw away from that amount of power up to a load of 300 the Treadwell Company are deprived of its use and if we were to exceed 300 and the generator is then making 500, as you say, and then we draw 300 horse-power there will be available for their use 200 horse-power.

Q. Now, then, we will say that the generator generates its full capacity, or is supposed to generate, when there is plenty of water, there is a certain amount [289—222] of electric current furnished you when you get 300 horse-power and then there is a certain amount that remains for use for the

(Testimony of H. L. Wollenberg.)

Treadwell Company; isn't that true, Mr. Wollenberg?

A. That is true.

Q. Now, when you change, your power factor does not affect the amount that remains for use by the Treadwell Company?

A. The amount of what?

Q. The amount of available power?

A. It would not affect the amount of available power.

Q. You could change your power factor to one per cent so that it requires the entire output in amperage of 19 machines and still draw upon the generating plant now existing at Sheep Creek and leave for the use of the Treadwell Company the same amount of power that they would normally have; is that true?

A. So far as the power is concerned—well, let me make one stipulation. You have introduced a condition of one per cent power factor which would probably involve changes in efficiency, and all sorts of things that we don't know at all, because it is such—it is not a case within reason. But if you will assume that the efficiency of your generators is only one per cent power factor—I don't know what a generator would produce with one per cent power factor—it is an unheard of thing—but assuming that is the case, and we are drawing on them for a current of one per cent power factor [290—223] drawing three hundred horse-power, this is what would happen, why, it would give the

(Testimony of H. L. Wollenberg.)

ampere capacity of this you mentioned—machines you mentioned, but the governors on these machines would shut down the water because these machines would not be receiving water enough, or the governors on these machines would turn the water off these machines and they would take a little bit of water, a very little bit of water necessary to furnish this 300 horse-power on these machines, but it would involve the capacity, the ampere capacity of those machines, but your governor on each one of those machines would turn the water or other prime motive source back, away from the motor, for although they are still generating 300 and each would demand a little bit of power to develop that 300. Do I make myself clear?

Q. You are not answering my question?

A. I am trying to.

Q. My question is, if the entire capacity of the Sheep Creek plant is drawn by you in amperage, is there any amperage or power left for the Treadwell people to use—yes or no?

A. If the entire generator—

Q. Generating capacity in amperage is taken by you—

A. —if the entire generator capacity in amperage is taken by us they would not use that—have no other power—could not use that—have no other power. Have to install more machines.

Q. Have to install more machines? [291—224]

But at the same time their prime motive source or

(Testimony of H. L. Wollenberg.)

power is then going to waste and not being used.

Q. I know, but I am talking about the machine they have there now?

Q. (By the COURT.) I would like to have this answered. Suppose the Treadwell Company kept right on using the power created; now, then, what is the condition as to the amperage with a one per cent horse-power?

A. If in addition to the load the Treadwell people would keep a load of 300 horse-power on with a one per cent power factor?

Q. Yes.

A. Yes, it would overheat the machines.

Q. That is the Treadwell machines?

A. The generating machines, whatever ones run the line.

Q. (By Mr. J. HELLENTHAL.) In other words, the generating machine couldn't furnish it, that is so?

A. No, couldn't furnish that amperage.

Q. Now, returning for just a moment to the time relay circuit-breaker. The object of the time relay circuit-breaker is to enable the consumer or whoever it is that draws from the bus-bars to momentarily draw a surge or starting current—what you call it surge—we call it starting current—an excess of current during the time for which the circuit-breaker is set; is that not right?

A. That is one of the purposes of a time relay circuit-breaker.

Q. That is one of the effects?

(Testimony of H. L. Wollenberg.)

A. That is one of the purposes, yes, one of the effects too. [292—225]

Q. What time would you set your circuit-breaker now if you were operating—a minute?

A. I would put an inverse time relay on there and set it at half a minute or a minute as conditions on the line needed, I would not—I would adapt that to the line, I am suggesting an arrangement to accomplish a certain purpose of delivering 300 horse-power, to deliver the equivalent of 300 horse-power, and it may be that from experiments as to the length of time the relays would be needed. I think a minute would satisfy it.

Q. All right. We are assuming now a minute would satisfy it and during that minute the customer or the plaintiff in this case would be able to draw that quantity in amperage and voltage that they likely desire? A. No.

Q. Would they not?

A. Not with the inverse time relay circuit-breaker that I suggested.

Q. Well, how much would that draw?

A. Well, you could control that.

Q. Suppose it is true your form K machine requires 600 additional horse-power to start—we will assume that to be the case—then you would draw for the minute of time that the machine was set an additional 600 horse-power, would you not?

A. No; no machine requires a surge such as that for the length of a minute. The peak of the surge is instantaneous and drops back.



(Testimony of H. L. Wollenberg.)

Q. How long would it require?

A. I don't know.

Q. For some space of time how much—length of a minute? [293—226]

A. Very much less than a minute, a surge of any magnitude.

Q. All right, we will say for ten seconds, half a minute, how will that go?

A. Are you talking about a peak surge or a surge of any magnitude for 300—

Q. And a peak surge?

A. Well, a peak surge only last momentarily.

Q. How long will you require that surge at all?

A. About 300?

Q. Yes?

A. Well, I wouldn't make a definite answer to that; I don't know.

Q. Probably a minute?

A. I am not sure, but much less than a minute.

Q. During that time you would require that, be it half a minute or ten seconds or a minute, it would be giving the excess of 300 horse-power, would it not?

A. It would under the existing conditions like where the voltage is artificially maintained constant, or nearly constant, probably it would.

Q. The only way in which you could draw an excess—we will say is the excess, is the additional three hundred horse-power—whatever it may be, might as well fix upon that as any, Mr. Wollenberg, for the purpose of getting it now—suppose you required an additional 300 horse-power during this

(Testimony of H. L. Wollenberg.)

short space of time you couldn't get that additional 300 horse-power unless it were there on the bus-bars for you to draw from, could you?

A. There isn't such a thing as putting it there on the bus-bars, Mr. Hellenthal; that is a condition that you [294—227] picture that does not exist.

Q. Well, you would have—the generating plant would have to be generating it then, put it that way?

A. In the case that these different power plants being connected in synchronism, these various plants of the defendant companies, if you get that excess power, why, naturally what you get it from you get from the generating plant.

Q. Yes?

A. But in the event of that Sheep Creek generator being disconnected or only having water enough to produce 300 horse-power the generator, would not have to produce 300 horse-power to start that motor.

Q. Your voltage would simply go down?

A. Your voltage would drop and your machine would perhaps lose a little in speed momentarily and accomplish a starting surge.

Q. If your power was large enough it would burn the generators on account of the sudden reduction in your voltage?

A. If your power was large enough to exceed the safe amperage of the corresponding capacity of the generator it would burn them.

Q. Now, we are not talking about that, Mr. Wollenberg. We are talking about the case as it exists over here. But you could draw the additional 300

(Testimony of H. L. Wollenberg.)

horse-power, it has got to come from some of these plants; some of these plants have got to generate it?

A. Every time that case exists, if you do draw 300, it has got to come from the plant [295—228]

Q. Now, if you install the time relay circuit-breaker such as you suggested and under the conditions of which you spoke, the additional surge or starting current can be drawn by the consumer at any time, can it not? A. Yes.

Q. It then becomes necessary for the power company furnishing the power to have its generator producing this additional 300 horse-power at all times; is that right—so as to have it there when it is demanded? A. Absolutely not.

Q. Where are you to get it from if you don't produce it, Mr. Wollenberg?

A. You will have the same condition that I spoke about a moment ago with reference to the individual plant operating there. If all the plants on the Treadwell circuit, on the entire synchronized circuit there were generating at a given capacity and that is not changed and the Treadwell Company itself is absorbing everything, the 300 horse-power of the available—

Q. Yes?

A. —of the available power and we started that motor, it will under those conditions—

Q. Yes?

A. —the surge of current which occurs on the start of your motor there acts as a pulsation on the line which is to the surge most impressed with it for the pulsation affects this drawing and simply means

(Testimony of H. L. Wollenberg.)

a surge of amperage to this point as a starting condition and an immediate restoration of normal conditions, and you don't have to have that extra [296—229] power in the circuit for the purpose of commencing—

Q. Provided you have sufficient power to furnish—

A. To furnish the 300.

Q. To furnish the 300? A. Yes.

Q. But the power is taken from the Treadwell Company's plant and as a result there is either a slacking down or shutting down of their plant, depending upon the size of the peak; is that not true?

A. Well, yes, the effect on the Treadwell system is dependent on the size of that peak.

Q. If the peak is small it will slow down the machine; if it is large enough it will shut down the machine; isn't that true?

Mr. SHACKLEFORD.—Just a moment, if the Court please. I would like to inquire of counsel if he is asking this question with reference to the conditions in this case, that is such a peak as would arise from starting the 300 horse-power?

Mr. J. HELLENTHAL.—Well, the question as to what this peak is, is a matter of testimony upon the witnesses don't agree.

Mr. SHACKLEFORD.—Well, they did the other night, approximately. I didn't know of any change.

Q. (Read by the REPORTER.) If the peak is small it will slow down the machine; if it is large

(Testimony of H. L. Wollenberg.)

enough it will shut down the machine; isn't that true?

A. In the case just stated, if large enough peak, it opens the circuit breaker—a peak of magnitude would open the circuit-breaker. [297—230]

Q. (By Mr. J. HELLENTHAL.) You would then put on an instantaneous circuit-breaker?

A. An inverse time relay circuit-breaker has the function of opening up immediately under a peak of predetermined magnitude.

Q. All right. Now, you were testifying a little while ago in answer to Mr. Shackleford's questions, that you commenced certain work—laid out certain work in connection with the operations of the plaintiff company and were dependent upon this 300 horse-power to furnish you with power; is that right?

A. I did not testify as to work that we laid out for this power, as I recollect it.

Q. Didn't you?

A. I don't recall so testifying. I will be glad to refresh my memory.

Q. Well, you have been connected with the plaintiff company for some time, Mr. Wollenberg?

A. Yes.

Q. A matter of a year or more? A. Yes.

Q. You knew all the time that this contract didn't furnish you starting peaks and didn't furnish you a horse-power or peak that you could utilize except with a snychronized motor for your purposes so you would get 300 horse-power?

A. You say I knew that?



(Testimony of H. L. Wollenberg.)

Q. Yes? A. No, I didn't know that.

Q. You know Mr. Kinzie?

A. Very well. [298—231]

Q. You remember meeting Mr. Kinzie in Mr. Shackleford's office? A. Very well.

Q. Some time about a year ago? A. Very well.

Q. You remember at that time you tried to negotiate with Mr. Kinzie to sell you these peaks?

A. No, I would be glad to relate what took place at that time.

Q. All right?

A. At that time I met Mr. Kinzie in Mr. Shackleford's office and told him of Mr. Thane's plans in the formation of these companies which would operate the property under discussion and also talked over regarding the and the Oxford-Treadwell 300 horse-power. I told him in effect of the consummation of those plans, that I expected to have a part in the designing and operation of the work to be done and was at that time considering what disposition we would make of the 300 horse-power if we received it and the plans consummated. I said to him at that time that I had read the contract and that it wasn't specific. It was a layman's contract—I am not attempting to repeat my exact words to you.

Q. Just in substance?

A. This is the substance of it. And I didn't see how in the deuce they could furnish us with an uninterrupted current of 3 horse-power and not allow us to take—

Q. (By Mr. SHACKLEFORD.) 300?

(Testimony of H. L. Wollenberg.)

A. Yes, 300. [299—232]

The COURT.—You said three.

A. (By the WITNESS.) I didn't see how they could furnish us with 300 horse-power and yet comply with the statement in the contract. It is to be uninterrupted except from natural physical causes beyond our control, because, I says, "I don't know of any electrical device will strain 300 horse-power off the line and not allow any more to pass." I says, "It looks to me a case of circuit-breaker"—that is exactly what I said to him—"a circuit-breaker set in there at 300 would interrupt the current every time we reached the height which we were to take, and," I said, "In practical operation it is very difficult to work up to 300 horse-power and not exceed it would have surges coming over the line or anything that will operate a circuit-breaker." I said to him, "It seems to me the equitable way to interpret this contract and operate under it is to put a curve-drawing wattmeter on there. We will then try to arrange our loads on this feeder in such a way that we will draw a maximum of 300 horse-power and when, in the event—in the summer-time you get more than you can use"—which I believe to be the case "and you are willing to sell us peaks, we can pay you for the excess." And that is the tenor of that part of the conversation I had with Mr. Kinzie.

Q. At that time Mr. Kinzie told you, Mr. Wollenberg, that he had no disposition to sell any power and if he did have such disposition you would have to consult with Mr. Bradley?

(Testimony of H. L. Wollenberg.)

A. He told me he thought that might be a nice way to [300—233] arrange it, but told me he wouldn't take any action and wouldn't discuss it, but he knew I was going to San Francisco and asked me to discuss it with Mr. Bradley.

Q. You went to San Francisco?

A. I went to San Francisco.

Q. And you talked this matter over with Mr. Bradley. What occurred between you and him?

A. Mr. Bradley first referred me to Mr. Kinzie and I informed him that I was—that I had seen Mr. Kinzie. Mr. Bradley next said, "I don't know who you are, any way. I don't know why you talk to me about this." I said, "Mr. Bradley, I have known you for a number of years and I thought if I came over here and told you I represented these people in this particular matter that would be sufficient." I said, "If you don't want to talk to me on that account I will produce credentials." He then passed that up. I said, "We are now preparing plans of the various companies and are about to purchase our electrical equipment." I said, "I would like to find out from you the manner in which you wish to make delivery of this contract and such other circumstances around it as you wish to suggest and prescribe, or, in other words, what your attitude is going to be, so far as consistent with our rights, so we can conform to it in the purchasing of the apparatus and designing of our system." I says, "I would like to discuss with you such features, whether you would object to our synchronizing with you, and what meas-

(Testimony of H. L. Wollenberg.)

ure you [301—234] intend to measure the current with—where you intend to allow us to attach our line.” Mr. Bradley says, “This is,” he says, “I am not an electrician; I don’t want to talk to you about it.” He says, “Besides, it is a question for lawyers.” He says, “It is a question for lawyers.” And then he said, “Anyway,” he said, “I don’t like you coming in here and trying to find out what we are going to do about the contract.” He said, “You have no business coming trying to find out what we are going to do; have no business trying to find us out.” I said, “I am not trying to find you out.” And I said, “I have come here in a spirit of fairness, previous to purchasing the machinery and designing the line to carry that power; I have come to you in a spirit of fairness to see what arrangements can make—to arrange the thing with you,” I said, “and to discuss the attitude of your company.” And the conference being at an end I left him.

Q. You didn’t tell Mr. Bradley at that time you would not be able to utilize or develop 300 horsepower except with a synchronized motor, but you could develop 300 horse-power with a synchronized motor?

A. I may have made the statement—no, I did not make that statement. The words I don’t remember; the exact statement I am not giving, but the substance. I may have said this—no, I didn’t make any such statement as that, Mr. Hellenthal.

Q. Didn’t you tell Mr. Bradley with a synchronized motor you could get out the entire 300 horsepower? [302—235]



(Testimony of H. L. Wollenberg.)

A. I may have said I could with a 300 horse-power synchronous motor, just in that way, but I never made the statement exclusively with a synchronous motor could use that 300 horse-power.

Q. You didn't state if you used an ordinary induction motor could not use 300 horse-power?

A. I made the statement, if used an ordinary induction, ordinary phase single motor equal to 300, that it would require a starting surge of amperage greater than that required during its normal running, and I asked Mr. Bradley what his disposition was regarding that—how he interpreted the contract, and he told me—

Q. What did he tell you?

A. He says, "The way that power is valued in the contract, he says, "is only valued at twenty-five thousand dollars in the contract," and he says, "power valued at so small a figure as that, that would mean that a surge would be allowed"; that was what he told me.

Q. Mr. Bradley told you that in San Francisco?

A. Mr. Bradley told me that in San Francisco.

Q. That is a year ago?

A. Approximately a year ago.

Q. Now, Mr. Wollenberg. you also know Mr. Kingsbury, at the power plant, do you not—the Treadwell power plant here?

A. Yes, I know him.

Q. Mr. Wollenberg, do you have any recollection why you were obliged to go to Treadwell to get the



(Testimony of H. L. Wollenberg.)

power back on when the circuit-breaker went out at Sheep Creek?

A. No, my recollection— [303—236]

Q. Yes.

A. —I know of no reason except, as previously stated, that Mr. Kennedy had suggested to me that it was a penalty that was—it was a penalty for our attempting to overdraw 300. He didn't use the word "penalty," but that was the substance.

Q. He didn't use that word?

A. No, not the word "penalty." I have been trying to recall the exact word he used. I think I said, "Mr. Kennedy, what the deuce they were doing, what the deuce they were figuring on to insist on an absurd and unreasonable condition like that." And he said, "Well, you fellows are trying to get more power than is coming to you," or words to that effect. He didn't use the word "penalty," but he implied it.

Q. Did you make a visit to Mr. Kingsbury at the Sheep Creek power plant about a month ago?

A. A visit of myself?

Q. Yes.

A. I have been there a number of times.

Q. You remember being there about a month ago, to the Sheep Creek plant, talking to Mr. Kingsbury, telling him—asking him to hold the circuit-breaker in so you could start or do whatever it was you wanted to do, that the people of Treadwell wouldn't know anything about it?

(Testimony of H. L. Wollenberg.)

A. No, I never asked him to hold the circuit-breaker.

Q. What did you ask him?

A. Did I ask him?

Q. In that connection?

A. Well, I don't know what you mean in that connection. [304—237] I have never asked him to hold the circuit-breaker in.

Q. What did you ask him to do in connection with the circuit-breaker—anything?

A. No, I never made a request on him to do anything in connection with that circuit-breaker.

Q. Ever make any request on him to do anything in the way of furnishing you a surge, as you call it?

A. I never have.

Q. Or had any talk with him about the matter at all?

A. I have had a considerable discussion with him upon the matters of the operation. I have called there a number of times and we had conversations regarding the setting of the circuit-breaker and his instructions regarding it and all the attending circumstances.

Q. Did you ever ask him to change the setting of the circuit-breaker? A. I never have.

Q. Did you ever ask him to do anything at all to the circuit-breaker? A. I never did.

Q. Never asked him at any time to give you anything you were not entitled to in such a way the Treadwell people wouldn't know anything about it?

A. I never did.

(Testimony of H. L. Wollenberg.)

Mr. HELLENTHAL.—That will be all. [305—238]

Redirect Examination.

Q. (By Mr. SHACKLEFORD.) Mr. Wollenberg, considering this starting surge and its effect on the Treadwell line, is it not true that the fly-wheel of the Treadwell plants would not carry their machine past any possible effect resulting from a starting surge of 300 horse-power?

A. It certainly would.

Mr. SHACKLEFORD.—Just read that question over again, Mr. Reporter, so the witness will understand it.

Q. (Read by the REPORTER.) Mr. Wollenberg, considering this starting surge and its effect on the Treadwell line, is it not true that the fly-wheel of the Treadwell plants would not carry their machines past any possible effect resulting from a starting surge of 300 horse-power?

A. It would; that is, assuming the normal load on our line.

Q. That is, the fly-wheel effect would protect them—protect them from shutting down or any trouble?

A. It would.

Q. Mr. Hellenthal has asked you to calculate the effect on their line with the power factor at 19 per cent and one per cent; state if this condition would ever exist under any ordinary working conditions such as our machines are rated at, etc.

A. I know of no conditions whatever whereby we would use 300 horse-power at a condition of power

(Testimony of H. L. Wollenberg.)

factor of my assuming those power factors.

Q. Do you know any condition whatever where the increased amount of amperage or momentary increase in amperage resulting from starting these machines would affect [306—239] the practical efficiency of the Treadwell operations?

A. I know of none.

Q. I want you to explain to the Court, Mr. Wollenberg, if the condition of unity power factor just being discussed here exists in this mining district at all.

A. Not at all, to my knowledge or belief.

Q. Is there any material difference between the operation of the machines of the plaintiff company and the operation of the machines of the defendant companies with reference to those drawing power from that plant? A. I know of no difference.

Q. If the power factor were figured out in both cases it would be below unity? A. It would.

Q. You say below unity and probably approximately—not the same, within the same—in the same rating something like the same rating?

A. Why, I think they are comparable; yes.

Q. Now, regarding the capacity of a generator's rating, what is the meaning of that? Explain the operation of that.

A. Well, the rating of a generator is controlled by the safe heating effects of the generator. Now, when a generator is rated for 1,000 kilowatts, it is a well-recognized fact that that generator will be called upon for surges of amperage in excess of the amperage corresponding to 1,000 kilowatts. For example,



(Testimony of H. L. Wollenberg.)

the information was given me here a few minutes ago that the amperage rating of the Sheep Creek generator is 294—that is correct, is it not—now, that does not mean that that machine will be dangerously overheated if called upon to produce more amperage than that for a [307—240] short period? As a matter of fact, it is now a standard practice, or nearly so, with the best manufacturers to rate a machine at a certain amperage, as this one is rated at 294, and then guarantee an overload capacity of 50 per cent for a certain period and of 25 per cent generally for a longer period. In other words, the manufacturer of a generator takes into account in his rating of that machine the fact that there are calls upon the machine for amperage in excess of its normal output and that provision is made for—that provision is made in every generator of reputable make. If I had the time I think I could find the rule in the American Society governing that subject. Is it desirable that I should look up this rule?

Mr. SHACKLEFORD.—Go ahead, Mr. Wollenberg; tell the Court about that.

The COURT.—Well, don't take up the time; do it some other time.

Q. (By Mr. SHACKLEFORD.) All right. Now, Mr. Wollenberg, we will assume that the defendants in this case are engaged not only in the delivery of power under contract to the plaintiff in this case but they are engaged in the sale of power from their circulatory system consisting of Sheep Creek, Nugget Creek and their turbine plant, which are to-



(Testimony of H. L. Wollenberg.)

gether, as I understand, to the Alaska-Juneau Gold Mining Company, a different and distinct corporation operating tunnels, for the purpose of driving tunnels near Juneau and in Snowslide Gulch. Assuming that its motors are not synchronous, would the power factor be involved in that delivery? [308—[241] A. Certainly would be.

Q. Assuming the power produced at Sheep Creek of a certain amount delivered to these various points where they have inductive motors, is there any way of equitably dividing that total power produced except upon the basis of the ratio?

A. The only equitable way of dividing that production is by wattmeter measurement upon the feeder of the various consumers concerned.

Q. And that measurement by wattmeter would involve the power factor of the various points of consumption? A. It certainly would.

Q. Lines of consumption. And if they delivered to themselves and the Alaska-Juneau power upon that basis and delivered power to us entirely upon the ammeter basis, who suffers thereby in the division of the total power produced?

A. We suffer, and they gain by whatever we suffer.

Q. Now, there is another question. In any conversation that you have had with Mr. Kinzie or Mr. Bradley have they ever offered to synchronize this current? A. Not in any conversation with me.

Q. Well, to place the machinery, synchronous machinery on the current? A. Never have.

Q. Have they ever requested you to do so?

(Testimony of H. L. Wollenberg.)

A. They never have.

Q. Assuming the setting of this circuit-breaker as it was originally set when they offered the power to you [309—242] after you had bought your machinery and installed it, would you have had any difficulty in proceeding during the winter if they had kept up the original power which was offered by that setting of the circuit-breaker?

A. We would have had none.

Q. Until after the fire or about the time of the fire in the Perseverance mine, there was offered to you a sufficient amperage according to the estimate to give you 80 amperes at least?

A. Sometimes as much as that; we had as much as that at that time.

Q. Which would be a correct amount under your power factor?

A. Be an amount equivalent to 300 horse-power at 72 per cent power factor, which is about what we have.

Q. Until the short winter season—the season of short water in Alaska here was any effort or information given upon their part requiring you to use a synchronized motor and reduce their current so it would be ample for you to use? A. None.

Q. What period of the year, with reference to the present time and the few months to ensue—what period of the year is the low water period at Sheep Creek?

A. Well, it is the ensuing two or three months during the normal year.

(Testimony of H. L. Wollenberg.)

Q. Now, Mr. Hellenthal has asked you a number of questions with reference to the change in power factor commencing at Sheep Creek where you delivered power right at the plant and carrying it on up to the Perseverance and then [310—243] up to Skagway. I don't know whether he drew the 300 horse-power out as far as Dawson or not, but I don't think he did. But I want to ask you this question: Has the power factor—the change in the power factor anything to do with your line loss, which is chargeable as against you, and your transformer loss—actual loss of power?

A. Yes, the power factor in a system increases the line loss; but in this particular case the whole question and all the series of questions that Mr. Hellenthal asked me were based upon the delivery of 300 horse-power at the panel at Sheep Creek. Now, the line losses between here and Skagway, or wherever you choose to take that current, are suffered by the plaintiff company, and were the current actually taken to Skagway the amount available there to the plaintiff company for useful work, if they were getting 300 down here, would be a very trivial amount, even if they wanted to have high voltages and very heavy lines in order to transmit a small amount that ridiculous distance.

Q. The meter when placed on a switch-board at the Treadwell plant measures the power actually passing over the line at that point?

A. That measures the line losses—the entire consumers' power from that point out to wherever the

(Testimony of H. L. Wollenberg.)

furthermost load is. That wattmeter down at the Sheep Creek panel sums up all the losses, whether they have line losses, efficiency losses, in the motors, losses in the transformers or any other losses, it sums them [311—244] up and that is the entire amount of power delivered at that point.

Q. Would that wattmeter correspond with a meter at a distance?     A. No.

Q. Where you actually use the power?

A. No, it would not. If you had one meter down at the Sheep Creek panel reading 300 horse-power and another up in the Perseverance mine that one up there would read less by some—I won't attempt to state the amount—but whatever amount of the current is consumed in heat on the lines and transformer losses and the further we take the power it will increase our losses tremendously, and so the less we have for useful effect; but that does not have any bearing on the particular case before us, and whether we use it up in line losses or in the motors or running lights or whatever we like doesn't affect the current furnished nor does the power factor in our system affect the amount of actual prime motive power used to give your 300 horse-power. The distinction must be made clear between efficiency and power factor. Efficiency is an actual loss of power due to a combination of electrical energy and the heating or any other loss, and a motor consumes power by mechanical transportation since electrical—mechanical energy, the power factor accompanies a condition in the circuit in which the voltage and



(Testimony of H. L. Wollenberg.)

amperage are not in phase with each other and it is entirely a condition of the circuit, [312—245] does not represent a loss of power, and should in no way be confused with efficiency.

Q. Well, Mr. Wollenberg, just one other question I will ask you. It is certain that with a given amount of water productive of 300 horse-power that the beneficial use of a current of 300 horse-power can be procured by separate generators?

A. It is certain.

Q. That is the only way that you know of without an equitable adjustment of securing an uninterrupted current from the defendants' plant?

A. That is the only way I know of.

#### Recross-examination.

Q. (By Mr. J. HELLENTHAL.) Just one question, Judge. Mr. Wollenberg, the lighting plants in this country will develop power at unity power factor, do they not—that is practically unity power?

A. Develop it at that?

Q. That is the lighting plants all take power at unity power factor?

A. Not lighting plants—lights themselves.

Q. The lights themselves?

A. But the distributing system for the lights has a power factor which affects the current.

Q. But you told Mr. Shackelford a moment ago, in answer to the question—I think you overlooked the lighting plant—

A. No, he asked me, as I remember it, whether I knew of a [313—246] power circuit having unity



(Testimony of H. L. Wollenberg.)

power factor—is that the question you referred to?

Q. Yes. A. Well, I referred to it.

Q. Don't you know the lighting circuits have unity power factor?

A. No, they have nearly unity power factor.

Q. That is what is usually regarded as power factor—usually regarded as unity power factor?

A. No, it depends if you have a light put in a place where you don't transfer the circuit and your lights lead from your generator, that light will but then you would have practically a unity power factor, but if you have a lighting company in a big city with a large transformer they don't have a unity power factor.

Q. The big cities in Alaska are rather scarce?

A. Well, this town is big enough for the distributing system to have a considerable power factor.

Q. Well, now, Mr. Shackelford also asked you whether any other form of motors were in use in Alaska except the inductive motors similar to the ones you use. Did you ever see a form K motor or compressor in your life except where you have it up to the Perseverance? A. Yes.

Q. Where?

A. I myself installed one in a mine near Eureka, California.

Q. Near Eureka, California? A. Yes, sir.

Q. Any others?

A. I don't recall—I can't name any other place where I know they are. [314—247]

Q. The only power plant in Alaska that generates

(Testimony of H. L. Wollenberg.)

power for use in connection with mines are the Sheep Creek and Nuggett Creek plants of the defendant companies? A. In Alaska?

Q. Yes.

A. I would not pretend to say, Mr. Hellenthal.

Q. Do you know of any other?

A. I believe the Ketchikan Power Company furnishes some, though don't know that; I am not certain.

Q. There is a small power plant at Ketchikan for lighting purposes and probably furnishes some power?

A. I am not sure. I have no personal knowledge.

Q. You have no personal knowledge of the Ketchikan plant furnishing power for motors?

A. No, I have no personal knowledge.

Q. The only motors used in Alaska are motors in use by the defendant companies and yourselves?

A. The only motors in use in Alaska?

Q. Yes, the only power motors? A. Why, no.

Q. Where are the others?

A. I remember seeing some at the ice plant down at Ketchikan and I have no doubt that the—why I have heard of several installations of—of electrical installations in Alaska, I don't know as I could place them.

Q. Did you see them? A. No, no.

Q. You don't know what kind of motors they are?

A. No. [315—248]

Q. May be synchronous motors or may be induction motors? A. Yes.

(Testimony of H. L. Wollenberg.)

Q. Mr. Wollenberg, with reference to your qualifications as an engineer, I don't want to go into it very far. What school did you attend?

A. The University of California.

Q. When did you graduate? A. 1908.

Q. 1908. And what kind of a course did you take?

A. Took a course in mining engineer, and included with it a large number of courses in the department of civil engineering and electrical engineering.

Q. You didn't take a complete course in electrical engineering?

A. I didn't graduate as an electrical engineer.

Q. Your experience as an electrical engineer is confined to what you have had here since you graduated; is that not true?

A. Why, since I graduated—well, let it be understood in the beginning that I do not claim special and exclusive experience as an electrical engineer.

Q. You don't claim to be an electrical engineer?

A. An exclusive electrical engineer. I regard myself as a mining engineer and as such have performed many of the functions of electrical engineer.

Q. Your experience as electrical engineer is confined to the installing of the gas plant here and to the work done at Salmon Creek? A. No.

Q. What other work have you done?

A. I was engineer in charge of the Tahl Mining Company at Smoxville, Eureka County, California.  
[316—249]

Q. That is where you installed that form K motor?

A. No, that is not, that is another place.

(Testimony of H. L. Wollenberg.)

Q. How long were you there?

A. I was there about eight months, I think.

Q. What kind of a concern is that?

A. O, it is a gravel-mining concern.

Q. How large a plant have they got?

A. Why, they installed a plant for—let's see; I guess there were about six hundred horse-power motors in the plant.

Q. When was that? A. When was that?

Q. Yes. A. It was in 1910.

Q. 1910. What other experience have you had?

A. Well, I was—I was part owner in a lease of a mine near Eureka, a small place, and personally installed and operated motors at that plant.

Q. How large were the motors?

A. The biggest motor there was 25 horse-power, a small plant.

Q. What other experience have you had?

A. While an assistant at the North Star mine in Nevada County, California, I was a mechanical draftsman and designer and various other functions there, and while not having the entire responsibility of it—I was assistant in that instance—I worked upon the design and installation of a large number of motor-driven units including a new cyanide plant, new motors in the mill and various things.

Q. How long were you there, Mr. Wollenberg?  
[317—250]

A. I was there four months.

Q. Four months. What other experience have you had? A. In electricity?

(Testimony of H. L. Wollenberg.)

Q. Yes.

A. Those are the chief. Those are my chief experiences in electrical machinery exclusive of the experience with this company.

Q. And that includes the installing of the gas plant here and developing the Salmon Creek plant, as it is called?

A. Yes, the designing and installing.

Q. A recording wattmeter, Mr. Wollenberg, would record the surge as you call it, or as I say starting current, on the dial, would it not?

A. What sort of a meter are you speaking of?

Q. A curve reading meter.

A. You mean a curve drawing meter?

Q. A curve drawing meter. It would show a peak, would it not?

A. It would within the limits of the mechanism show the continuation and the entire output of the feeder.

Q. It would show the peak at the time *the time* the peak went in, would it not?      A. It would.